MONTANA OUTDOORS

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MONTANA OUTDOORS

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the cover

To many Mantanans, spring means mushrooms. With minimal effart, almast anyane can relish finding and eating wild mushrooms. We hope yau enjay the caver article and Recreatian Guide an page 19. Cover photo of the camman Marel mushroam by Frances V. Davis. Spring alsa means waterfawl winging its way north ta nest and naturally replace populatian lasses fram winter and fall martality. Back cover phata af Rass' goose by Jon Cates.

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a livable environment for WILDLIFE is a quality environment for MAN

FEDERAL INTERVENTION

For years, most state fish and game departments have been concerned about a growing instability in already tenuous federal/state relationships. A breakdown could vastly affect wildlife and outdoor recreation.

In the very first issue of *Montana Outdoors* (Nov./Dec. 1970), we featured this subject. We noted that the federal government (the people) could be viewed like other landowners and thus, deserved consideration from all fronts.

But since 1970, federal/state relationships have become strained on several fronts. Until recently, the federal government regulated only migratory species (i.e., waterfowl) and the states established regulations for all fish and nonmigratory wildlife. However, recent federal action with the grizzly bear gives the opposite impression—that federal intervention in what has always been state responsibility is a fact and no longer a threat. Under provisions of the Endangered Species Act of 1973, the U.S. Fish and Wildlife Service has proposed regulations to more or less take over grizzly management.

And even before the waves subsided on this proceeding, certain individuals and groups were pushing the U.S. Department of the Interior to follow suit with the bighorn sheep, mountain lion and other species.

Judging from our experiences with waterfowl regulations (Nov./Dec. 1974 "Director's Column"), the steel shot situation (page 2 of this issue) and some questionable federal management practices on wildlife refuges, we believe that nonmigratory wildlife would be in much better hands at the state level.

So we view federal intervention with considerable interest. But we won't become complacent about its likelihood. The federal government has some formidable cards in their hand—control of public lands, possible impoundment of federal aid to wildlife restoration (a certain disaster for Montana game management) and the national hunting and fishing license.

Also, there are 210 million Americans, 16 million hunters, 700,000 Montanans and about 130,000 Montana hunters who have something at stake in federal/state relationships. These facts are certainly foremost in our mind since we represent these people. Of equal importance is the fact that we also represent the wildlife and recreational resource in this state—and we continue with the strong belief that Montana can do a much better job with these responsibilities than the federal government.

Wes Woodgerd

Wes Woodgerd, Director
Department of Fish and Game

THE STEEL SHOT GAMBLE

by Dale Witt

watercolor by Tom Eversman

In recent years, loss of waterfowl because of lead poisoning has generated considerable alarm. Several groups have pressured the U.S. Fish and Wildlife Service (FWS) for action.

As early as 1973, restrictive bans on lead shot were proposed. The most stringent would require hunters to use steel shot in all flyways, on all public lands and for all birds.

In early 1974, the FWS released a draft environmental impact statement, including a timetable requiring use of steel shot in the Atlantic Flyway in 1976, the Mississippi Flyway in 1977 and the Central and Pacific flyways in 1978. In the Central and Pacific flyways, individual states and the

continued

FWS might name problem areas in which steel shot would be required (beginning in 1978) for waterfowl hunting.

If the strict proposals are fully implemented, what are the stakes of the game? Is the future of waterfowl sport hunting—or for that matter, the future of waterfowl—protected by a full house or a pair of deuces? What are the odds that the FWS unwisely gambled (1) that a more suitable shot would be developed before final implementation, (2) that tomorrow's crippling losses with steel shot will be less than today's lead poisoning losses, (3) that hunters will accept steel shot and its disadvantages and continue to support habitat development with their dollars or (4) that further restrictions on the hunter will not add fuel to an already raging fire set by the anti-hunters.

Perhaps all interested players should closely examine their hands before raising the pot.

THE ANTE

Waterfowl losses due to lead poisoning have been recognized since the turn of the century. In certain localities, these losses have exceeded 15,000 ducks during some years. Recent estimates of losses in the North American waterfowl population range from 2-3% annually, which means 2-3 million ducks, geese and swans die from ingested lead shot. Lead poisoning claims mallards as its principle victims, followed by pintails. Geese, swans and other ducks are affected in lesser, but still significant, numbers.

Waterfowl pick up lead pellets while feeding in shallow, heavily shot-over marshes or lakes. Waterfowl usually winter in these spots, although some dieoffs occur in migration areas. Ponds with hard bottoms and sparse vegetation make shot readily accessible to feeding waterfowl. Usually, the ingested shot disintegrates in the gizzard and the toxic effect paralyzes this organ. The bird takes in less food, so the gizzard's malfunction leads to starvation. The birds either die or begin to recover within three or four weeks. Sometimes the number of pellets ingested is so great that acute lead poisoning occurs. Blood, kidney and liver tissues are damaged, and death occurs in one or two weeks.

Some early lead poisoning experiments by Frank Bellrose of the Illinois Natural History Survey during the 1950s suggest that the bird's diet at the time of pellet ingestion affects the lead's lethality. With similar amounts of ingested lead in the gizzard, a corn diet was more lethal than one utilizing softer vegetation. Depending on diet, sometimes a bird died from ingesting only one lead shot.

DRAWING AN INSIDE STRAIGHT

At the same time Bellrose was doing his research, the ammunition industry was conducting experiments to produce a substitute for lead in shotgun ammunition. Other minerals, lead alloys and lead shot coated with other substances were tried, but most proved ineffective against poisoning from lead or other heavy metals. At that time, the only promising substitute was iron shot. It was nontoxic and could be manufactured in sufficient quantities for waterfowl hunting. The major drawback was ballistics—iron shot lacks the density of lead, so range and effectiveness decrease. Bellrose stated the switch to iron shot did not appear justified at that time.

So, the search for an adequate lead shot substitute continues. Ballistic engineers have searched for a practical replacement, but results have been relatively unrewarding. For now, the best contribution is "steel shot." It is nontoxic, but again it does not measure up ballistically.

Needless to say, the recent dilemma about steel shot regulations did more than create controversy. It also initiated more intensive research into the problem. Further efforts were made to develop a nontoxic but ballistically and economically suitable shot. Ammunition companies geared up to manufacture and market the steel shot in sufficient quantity. They also tested for crippling loss, ballistics adequacy and effect on gun barrels. The proposed changeover also precipitated re-evaluation of the severity of the lead poisoning in specific areas.

CALL THE BET

It was becoming apparent that

photo by Doug Looney

the timetable was premature. Industry was having difficulty producing a comparable substitute for lead shot. Studies by Winchester urged additional research, since the present steel product damaged some shotguns. To be safe, sportsmen owning double-barreled guns or older soft metal single barrels would have to trade them in for new models with hard metal barrels. Even with newer guns, barrel expansion at the choke was greater with steel shot than with lead. Also, the steel shot shells would cost an additional $2-3 per box. Reloading components for steel shot have not been developed for those who load their own shells.

During the 1973-74 waterfowl season, steel shot was required on certain areas of all flyways, mostly federal wildlife refuges and state management areas. One such area in Montana was the Benton Lake National Wildlife Refuge near Great Falls. Every other day, use of steel shot was required as a way of testing several aspects of the problem. Early in the experiment, it became apparent that hunter participation on steel shot days was consistently below that of lead shot days. During the 1973 season, 3.5 times more hunters showed up on lead shot days. In 1974, seven times more hunters were counted on lead shot days.

STANDING PAT

Hunters resisted the steel shot program because of (1) possible gun damage, (2) availability of steel shot only in 12 gauge No. 4's, (3) greater cost and (4) less range.

Because of enforcement problems in having two types of shot (lead and steel) in field use on the same area, upland game bird hunting was also restricted to steel shot. Hunters expressed concern this might be required on every flyway in future waterfowl seasons.

Individual states and the FWS conducted studies during the 1973-74 hunting season to determine the magnitude and distribution of the ingested lead shot problem. Wildlife management officials in the Central and Pacific flyways (including Montana) collected gizzards from hunter-bagged birds and analyzed them for ingested shot. In addition, the FWS studied the lead content in the wing bones of ducks using samples taken from a parts collection survey throughout the U.S.

Results of the gizzard studies generally agree with the distribution pattern of ingested lead in Bellrose's earlier study. (He found the highest levels of lead in the Mississippi Flyway, followed closely by the Pacific and Atlantic flyways. Lowest levels were found in the Central Flyway.) The lower levels found in the Central Flyway were caused by different habitat conditions, resulting in different waterfowl distribution and use of these habitats. For example, mallards wintered on large, deep water reservoirs which were not shot over and fed in grain fields. They ingested no lead shot. Also, many marshes in the Central Flyway have softer, well vegetated bottoms with less accumulation of lead easily ingested by ducks.

However, a few areas in the Central and Pacific flyways showed a high incidence of ingested lead and some history of lead poisoning. This prompted the idea of using steel shot in the Central and Pacific flyways only in problem areas. Imposing a lead shot ban where little or no lead poisoning occurs could cause many unnecessary waterfowl deaths due to the greater crippling effect of steel shot. Management on a problem area basis—steel required if high incidences of lead poisoning exist and lead required on all other areas—may result in less overall losses than ever before.

The majority of the Central and Pacific Flyway states, Montana included, endorse use of steel shot in problem areas. Although no problem areas have been indicated by gizzard collections so far in Montana, such areas *could be* handled with special regulations.

The Montana Department of Fish and Game opposes a blanket ban on lead shot in the Central and Pacific flyways until a more suitable substitute is developed. Inadequate substitute materials seem unnecessary, costly and burdensome to the hunter.

Rest assured, the sportsman would be the first to advocate a lead shot ban if scientific evidence warranted such action. After all, who is more concerned about waterfowl?

THE SANDHILL CRANE

Gangly, awkward and spindle-legged, yes, but it's still a great game bird.

by Ken Walcheck
photos by Harry Engels

To the uninitiated, the sandhill crane looks like the brother of some long-legged prehistoric creature. With its elongated, sinuous neck, the gangly, awkward bird could easily have stepped from an obscure chapter of the Lower Pliocene, some nine million years ago.

It has been described as "non-sporty, stupid, fishy tasting, unpalatable and tough." Unfortunately, these impressions stem from those who like to pigeonhole birds—such as cranes, herons and egrets—with similar structural features and give them a collective name such as "fish eaters" or "gooney birds."

Many persons confuse the sandhill crane with the great blue heron. Both cranes and herons have long necks and legs, but the resemblance ends there. In flight, cranes are easily identified because they fly with neck and legs fully outstretched; herons fly with the neck crooked in the shape of an "S" and with awkwardly trailing legs.

Differences in vocal calls serve as another means to distinguish the two species while in flight. The voice of the sandhill, vibrant and far-reaching, suggests something prehistoric, a call that might have echoed through past eons when pterodactyls and their relatives flew over large, inland swamps. Many attempt to describe the loud, sonorous notes of the sandhill crane, but few are successful. Ornithologist Hamilton M. Laing recorded one of the better descriptions. The calls of the crane are syllabified in his 1915 field notes as:

"Gar-oo-oo-oo-oo! Gar-oo-oo-oo!—the fair weather, sky-scrapping call."

"Hur-roo-oo-roo-roo!—a broken, three-word call of inquiry when one flock on the wing seeks another far below."

"Kit-er-roo-oo-oo! — Danger! Look out for yourself!"

"A-rook-crook-crook! A-rook-crook-crook! Come on; safe feeding here."

The great blue heron, in contrast, has a hoarse, guttural croak: "Frahnk, frahnk, frahnk."

Cranes, members of the Order Gruiformes (which includes other crane-like birds such as rails, coots and gallinules), rank high on the evolutionary scale. Ornithologists arrange birds in an evolutionary sequence from the most primitive to the most highly evolved. Cranes rank above ducks, geese and swans, birds of prey, upland game birds, and just below shore birds such as gulls and terns.

The crane's position on the evolutionary ladder is partially justified by its extravagant and impetuous courtship displays. Absurd and exaggerated to human eyes, the peculiar, ludicrous performances during mating season have been documented by many observers. Dr. E.W. Nelson, in a personal communication to A.C. Bent, author of "Life Histories of North American Marsh Birds," relates his experience with a pair of dancing cranes in Alaska as follows:

"The first comer remained alone but a short time, when a second

continued

bird came along, uttering his loud note at short intervals until he espied the bird on the ground, when he made a slight circuit, and dropped close by. Both birds then joined in a series of loud rolling cries in quick succession."

Nelson continued, "Suddenly the newcomer, which appeared to be a male, wheeled his back toward the female and made a low bow, his head nearly touching the ground, and ending by a quick leap into the air; another pirouette brings him facing his charmer, whom he greets with a still deeper bow, his wings meanwhile hanging loosely by his sides. She replies by an answering bow and hop, and then each tries to outdo the other in a series of spasmodic hops and starts, mixed with a set of comically grave and ceremonious bows. The pair stood for some moments bowing right and left, when their legs appeared to become envious of the large share taken in the performance by the neck, and then would ensue a series of stilted hops and skips which are more like the steps of a burlesque minuet than anything else I can think of."

Fourteen species of cranes—the Gruidae family—are distributed throughout the world, with the exception of South America. North America has two species, the rare and endangered whooping crane, *Grus americana,* and the sandhill crane, *Grus canadensis*. Dr. Lawrence H. Walkinshaw, an authority on North American sandhill cranes, recognizes five subspecies (forms that do not differ enough to be termed distinct species): greater, lesser, Canadian, Florida and Cuban.

Differences in body size, migration patterns and numbers help identify the three subspecies occurring in Montana.

• The smallest and most numerous subspecies, the lesser sandhill crane, migrates south through the Great Plains, and occurs in large numbers in Montana as they funnel through the eastern end of the state.

• The largest of the three subspecies, the greater sandhill crane, nests in selected marshes across the northwest, from southwestern Alberta to eastern Oregon, south central Idaho, southwestern Montana, western Wyoming and a small portion of northern Colorado.

• Biologists also recognize an intermediate or middle-sized subspecies known as the Canada sandhill crane. (Lesser and Canadian sandhills are collectively called little brown cranes.) Like the lesser sandhill crane, intermediates are transient visitors to eastern Montana during their migratory trek. The greater and little brown cranes rarely, if ever, mix while they are in Montana.

The little brown crane (lesser and Canadian) stands about 3 feet and weighs from 7-10 pounds. The greater sandhill crane stands over 4 feet and weighs from 13-16 pounds. The three types are difficult to distinguish because they have a similar ashy-brown plumage and differ only in size. Adults sport a partly bare, red forehead while young-of-the-year have variegated, rusty brown plumage and a completely feathered forehead.

In pioneer days, sandhill cranes were abundant. In short order, their numbers rapidly declined because of indiscriminate shooting and, more important, loss of breeding habitat due to encroaching civilization. When the sandhills' plight was finally recognized, full protection was given the species in 1916 with passage of the Migratory Bird Treaty Act. Current population estimates indicate there are about 10,000 greater sandhill cranes and 200,000-300,000 little brown cranes in North America.

Since the greater sandhill made a slower comeback and appeared to be in trouble, it was classified as a "rare" subspecies in 1966 by the U.S. Department of the Interior, according it full protection under both state and federal laws. It was removed from the list in 1972 because its status had improved. Greater sandhill cranes are not hunted in Montana or elsewhere in the United States. Fortunately, their migration routes are usually well separated from those of the little brown crane.

Recreational hunting of sandhill cranes in the United States was prohibited from 1916-1961 by the Migratory Bird Treaty Act under the idea that the species could not stand recreational hunting. Some subspecies (Florida and greater) were relatively scarce, although the lesser sandhill crane population exceeded 200,000 birds.

The first lesser sandhill crane season was conducted in 1961 in eastern New Mexico and western Texas because of (1) recurring depredations on cereal crops in Canada and the United States and (2) the growing conviction among game managers that this migratory game bird could withstand a properly managed harvest. However, the final decision on sandhill hunting was deferred for several years until more information could be obtained on distribution and abundance of the various crane populations. To prevent any danger to the nearly extinct whooping crane, migration studies of this species were also used in recommending areas and dates for the first open season on sandhills. Furthermore, a four-year (1962-65) post-hunting study was conducted to determine the feasibility of extending hunting to other states of the Central Flyway. Results led to hunting seasons in portions of Colorado (1967), North Dakota, Oklahoma and South Dakota (1968) and in portions of Montana and Wyoming (1972).

Most dyed-in-the-wool crane hunters would agree that the sport presents an exceptional challenge, even more so than goose hunting. Shooting over decoys in fields the cranes use for feeding is the preferred hunting method. Hunters in New Mexico—who have had over 10 years to experiment and work out a productive formula for bagging sandhills—find that homemade crane decoys (shell or silhouette) work quite well. But nobody has developed a commercial call for enticing cranes into the decoys, and with good reason. A crane possesses a wide

repertoire of calls which are extremely difficult to duplicate. Most callers try to pick a call, tune it and work on a productive imitation.

Cranes are extremely wary birds and not too many hunters have pulled a "sneak" on roosting or feeding cranes. Decoy hunters also have problems. If incoming birds don't like what they see at a feeding or roosting site, they circle and soar several hundred feet above the concealed hunters. Those who have hunted crane readily testify to the frustration and anxiety of going through the waiting period.

The first Montana crane season was launched during 1972 in Phillips County. Although the little brown crane is classified as a migratory bird with seasons established by the federal government, it is not designated as a migratory waterfowl and a federal duck stamp *is not* required.

Crane hunting in Montana has not yet stirred much interest, probably for the following reasons: Most hunters think cranes aren't worth bothering about; they're too "tough" to hunt and nobody really knows how to hunt them, and some hunters question their palatability. Dale Witt, department game management biologist, estimates about 50 cranes were taken during the 1974 season.

Fall-migrating cranes are quite selective about their stopover spots. In Montana, fall concentrations are largely restricted to glacial outwash plains where they utilize wetlands with large, shallow lakes and little vegetation. Phillips County has two large staging or gathering areas during the fall migration, Whitewater Lake and Bowdoin National Wildlife Refuge, both near Malta. According to Mike Aderhold, Glasgow regional information officer, most crane hunters prefer the pass-shooting method near a roosting area. Cranes have the unusual habit of roosting at night along the margins of large, shallow lakes and dispersing at dawn to feeding areas.

Goose hunters also bag cranes as a bonus bird over a decoy spread. Frank Gjersing, Glasgow game management biologist, reports that cranes will usually not set in a spread of goose decoys, but they can be taken fairly readily by hunters who conceal themselves in shallow depressions at the edge of a decoy spread. Apparently, cranes come in low over the outer perimeter of the decoys, affording hunters some lively shooting when they start to flare.

Much has been said—and will continue to be said—about the delicacy of roast crane, chicken-fried crane, charcoal broiled crane and crane cutlets. Early explorers and settlers quickly discovered that the flesh of cranes ranks high on the gourmet's rating scale. According to George Crinnel, senior author of "Game Birds of California," cranes brought fancy prices in the San Francisco and Los Angeles markets in the early days when turkeys were scarce. He writes: "In the season of 1895-96, 385 cranes were sold, bringing to the hunter about 50 cents each, considerably more than any of the geese. All testimony agrees as to the edible quality of the flesh of the crane, and this is to be expected from its chiefly vegetable diet."

Cranes are not fish eaters as many think. They are omnivorous, subsisting on various grains, green shoots, roots and tubers of grasses and sedges, insects and a variety of other invertebrates.

In a cooperative study by the New Mexico Department of Game and Fish and the Bureau of Sport Fisheries and Wildlife (now the U.S. Fish and Wildlife Service) designed to appraise the 1961 hunt, it was found that all hunters contacted placed a high priority on the crane's palatability: ". . . The crane prepared for the dinner table was also highly praised. Many methods of cooking were used, ranging from roasting to charcoal broiling. The breast meat, which is dark, was compared to that of the duck or goose, but much drier. The meat of the wings and legs was compared to turkey."

Some critics question hunting the sandhill crane. Richard S. Miller, professor of wildlife ecology at Yale University, wrote a blistering critique on the crane's mismanagement entitled, "The Programmed Extinction of the Sandhill Crane" in the February 1974 issue of *Natural History*. Unfortunately, Miller laced the article with half-truths and innuendoes such as : "ecologically unsound," "political pressures," "Government agencies . . . having to persuade hunters to shoot cranes in order to produce a 'successful' season," and ". . . many cranes discarded after they are shot."

In an attempt to predict consequences of different levels of hunting pressure through computer simulation models, Miller and associates formulated the extinction of the sandhill crane in 19 years, assuming that the annual harvest rate of 10,500-12,500 birds continues. Miller further states, "If the annual kill were only 4,000 . . . the population would decline from its present level of about 200,000 cranes and, at this amount of hunting pressure, would stabilize at this value."

Miller bases his conclusions on annual recruitment data (number of young added to the population each year) from fall surveys (1972-73) of sandhills in the Last Mountain Lake area of east central Saskatchewan. Miller estimated that the annual recruitment ranged from 4-8%. He further asserted, "The mortality from hunting, 5-6%, is nearly equal to, or at times exceeds the annual recruitment of new individuals into the population, leaving no room for natural mortality."

Miller fails to comment on recruitment estimates compiled by other researchers. For example:

- In 1966, W.D. Stephan and co-workers recorded a 16% recruitment at Last Mountain Lake and 27% at Quill Lakes, Saskatchewan.
- C.R. Madsen found a 9.4% recruitment in Kidder County, North Dakota in 1967.
- I.S. Guthery in 1972 reported 14.5% juveniles in samples ran-

continued

domly collected along the Texas coast.

• In 1973, D.H. Johnson and R.E. Stewart recorded 15% juveniles in their sample.

• J.C. Lewis, in 1974, recorded 19.1% juveniles along the Texas coast and a 15.3% recruitment in Oklahoma.

• From 1969-74, R. Drewien found recruitment rates in the Rocky Mountain population of greater sandhills ranged from 8-14%. A 1970 survey by Drewien in Mexico revealed a 15% average recruitment for several thousand lesser sandhill cranes.

Although the recruitment estimates vary, they are consistently higher than Miller's. The real danger, however, involves programming questionable biological data (as Miller has done) into a computer simulation model to predict long-term population trends.

Today's wildlife managers have outlived yesterday's notion of a "horn of plenty"; they have also recognized the dangerous rationale arising from computer programs laced with biased scientific data.

Because of criticism leveled at federal and state agencies by such groups as the National Audubon Society, crane hunting has become a sensitive issue. To agree to complaints of poor resource management without collecting more refined management data would simply invite additional complaints and more demands to stop crane hunting. As a result, the U.S. Fish and Wildlife Service launched a three-year study to obtain more accurate estimates of population size, annual recruitment and to periodically monitor major crane hunting areas to collect information on hunting pressure, harvest and crippling rates.

Sandhill cranes are not on the brink of extinction. Nor is crane hunting teetering on extinction's brink, not if concerned groups learn and act together.

The sportsman must serve as a strident force in perpetuating crane hunting as a recreational resource. As a consumptive user of the resource, he has had to learn to blaze trails through political and cultural thickets. He has already underwritten the salvation of numerous game and nongame species whose decline was not his doing. He has proved that certain species such as the sandhill crane can be managed and harvested to provide additional hunting opportunity for the sportsman, while protecting and wisely managing other species and subspecies of crane whose numbers justify no season at all.

THE WAY TO THE WILDERNESS

The Wilderness Society will sponsor over 110 trips to some of the most scenic wildlands on the North American continent. According to Jill Rowland, trip program director, excursion possibilities include horseback pack trips, hiking with packstock carrying the gear, backpacking, base camp hiking, canoeing and rafting.

The program is designed for the inexperienced person as well as the veteran wilderness traveler. Complete arrangements are made for the trip participant from the time he reaches the starting site until the outing ends.

Modern, lightweight equipment, sound camping practices and small groups assure a quality wilderness experience and minimize the impact on the wilderness environment, Ms. Rowland said. A conservation director usually accompanies each trip to answer questions and assist campers with other problems. In addition, outfitters are selected for demonstrated sensitivity to participant needs and proper wilderness use.

Length of individual trips varies. They fill up early so Ms. Rowland urges early registration. Membership in The Wilderness Society is not a requirement. A folder describing each trip and an application form is available from: The Wilderness Society, Trip Department, 4260 East Evans Avenue; Denver, CO 80222. Since The Wilderness Society is a nonprofit organization, please include 25 cents to defray postage.

HORSEBACK

LA GARITA WILDERNESS—June 28-July 7. From Wagon Wheel Gap, Colo. Bibs Wyley, Cottonwood Cove Lodge, outfitter. $400.

LINCOLN-SCAPEGOAT WILDERNESS—July 11-20. From Helena, Mont. Don Merritt, Wild Country Outfitters. $400.

WEMINUCHE WILDERNESS—July 11-19; Aug. 16-24. From Wagon Wheel Gap, Colo. Bibs Wyley, Cottonwood Cove Lodge, outfitter. $360.

BOB MARSHALL WILDERNESS—July 14-25; July 28-Aug. 8. From Missoula, Mont. Jack Hooker, outfitter. $460.

WIND RIVER WILDERNESS—July 23-31; Aug. 6-14. From Lander, Wyo. Irv Lozier, outfitter. $375.

SUN RIVER WILDERNESS—July 25-Aug. 3. From Helena, Mont. Don Merritt, Wild Country Outfitters. $400.

YELLOWSTONE WILDERNESS—July 31-Aug. 11; Aug. 14-25. From Jackson, Wyo. George Clover, Wilderness Trails, outfitter. $460.

ABSAROKA WILDERNESS—Aug. 2-11; Aug. 15-24. From Billings, Mont. Duane Neal, Black Otter Guide Service, outfitter. $400.

FLATHEAD-BOB MARSHALL WILDERNESS—Aug. 5-14; Aug. 17-26. From Great Falls, Mont. Chuck Blixrud, outfitter. $400.

SAN JUAN-RIO GRANDE WILDERNESS—Aug. 11-20; Sept. 22-28. From Durango, Colo. Bill Crader, Wilderness Safaris, outfitter. $400, $285, respectively.

YELLOWSTONE RIVER WILDERNESS—Sept. 5-14; Sept. 17-26. From Cody, Wyo. Dode Hershey, outfitter. $400.

LA GARITA WILDERNESS—Sept. 7-12. From Wagon Wheel Gap, Colo. Bibs Wyley, Cottonwood Cove Lodge, outfitter. $255.

HIKING WITH PACKSTOCK

LA GARITA WILDERNESS—June 16-24; July 23-31. From Wagon Wheel Gap, Colo. Bibs Wyley, Cottonwood Cove Lodge, outfitter. $295.

GROS VENTRE WILDERNESS—June 27-July 6. From Jackson, Wyo. L.D. Frome, outfitter. $325.

LINCOLN-SCAPEGOAT WILDERNESS—June 29-July 6. From Helena, Mont. Don Merritt, Wild Country Outfitters. $265.

WEMINUCHE WILDERNESS—July 13-20; July 27-Aug. 3. From Creede, Colo. Charles Kipp, outfitter. $265.

WIND RIVER WILDERNESS—July 13-20. From Lander, Wyo. Irv Lozier, outfitter. $265.

TETON WILDERNESS—July 19-28. From Jackson, Wyo. L.D. Frome, outfitter. $325.

MISSION MOUNTAINS WILDERNESS—July 21-28; Aug. 1-8. From Missoula, Mont. Bud Cheff, outfitter. $265.

UNCOMPAHGRE WILDERNESS—July 25-Aug. 1; Aug. 6-13. From Montrose, Colo. Farrel Hawk, Farrel Hawk Guide Service, outfitter. $265.

SELWAY-BITTERROOT WILDERNESS—Aug. 4-12; Aug. 18-26. From Missoula, Mont. Jack Wemple, Wildlife Outfitters. $295.

WASHAKIE WILDERNESS—Aug. 10-19. From Jackson, Wyo. L.D. Frome, outfitter. $325.

YELLOWSTONE WILDERNESS—Aug. 19-26. From Jackson, Wyo. L.D. Frome, outfitter. $265.

BACKPACKING

ESCALANTE CANYON WILDERNESS—Oct. 5-11. From Cedar City, Utah. Bob McDougall, Peace and Quiet, Inc., outfitter. $245.

FLAT TOPS WILDERNESS—July 1-7. From Vail, Colo. William Mounsey, University of the Wilderness, outfitter. $245.

HIGH UINTAS WILDERNESS—July 6-12. From Vernal, Utah. Bob McDougall, Peace and Quiet, Inc., outfitter. $245.

MUMMY RANGE WILDERNESS—July 8-12. From Denver. Vic Wolvin, Colorado Outdoor Educators, Inc., outfitter. $200.

EAGLES NEST WILDERNESS—July 13-19. From Vail, Colo. William Mounsey, University of the Wilderness, outfitter. $245.

JEWEL BASIN WILDERNESS—July 20-27. From Kalispell, Mont. Don Merritt, Wild Country Outfitters. $195.

MOUNT ZIRKEL WILDERNESS—July 20-26; Aug. 4-10. From Laramie, Wyo. Jim Richard, outfitter. $175.

HOLY CROSS WILDERNESS—July 25-31. From Vail, Colo. William Mounsey, University of the Wilderness, outfitter. $245.

SAWTOOTH WILDERNESS—July 27-Aug. 2. From Sun Valley, Idaho. Dean Hagmann, Wilderness Encounters, outfitter. $245.

COLLEGIATE RANGE WILDERNESS—July 28-Aug. 1. From Denver. Vic Wolvin, Colorado Outdoor Educators, Inc., outfitter. $200.

WEST ELK WILDERNESS—Aug. 6-12. From Gunnison, Colo. William Mounsey, University of the Wilderness, outfitter. $245.

HIGH UINTAS NORTH WILDERNESS—Aug. 17-23. From Salt Lake City. Bob McDougall, Peace and Quiet, Inc., outfitter. $245.

BEARTOOTH WILDERNESS—Aug. 18-24. From Red Lodge, Mont. William Mounsey, University of the Wilderness, outfitter. $255.

ZION WILDERNESS—Sept. 21-27. From Cedar City, Utah. Bob McDougall, Peace and Quiet, Inc., outfitter. $245.

BASE CAMP HIKING

MT. MCKINLEY WILDERNESS—July 5-12; July 14-21. From McKinley Park Station, Alaska. Celia Hunter and Ginny Wood, Camp Denali, outfitters. $350.

CANOE

MISSOURI RIVER WILDERNESS—July 14-20. From Fort Benton, Mont. Bob Singer, Missouri River Cruises, outfitter. $260.

CANYONLANDS WILDERNESS—Sept. 10-16. From Green River, Utah. William Mounsey, University of the Wilderness, outfitter. $280.

RAFT

HELLS CANYON WILDERNESS—June 16-21; Aug. 27-Sept. 1. From Lewiston, Idaho. Hank Miller, Idaho Adventures, outfitter. $325.

NORTH PLATTE WILDERNESS—June 23-27. From Laramie, Wyo. Jim Richard, Richard's River Trips, outfitter. $200.

CATARACT CANYON WILDERNESS—July 7-12; July 21-26. From Green River, Utah. Ken Sleight, Wonderland Expeditions, outfitter. $240.

MIDDLE FORK OF THE SALMON RIVER WILDERNESS—Aug. 13-17. From Salmon, Idaho. Hank Miller, Idaho Adventures, outfitter. $325.

SALMON RIVER WILDERNESS—Aug. 17-22. From Salmon, Idaho. Hank Miller, Idaho Adventures, outfitter. $325.

YOUTH TRIPS

(All youth trips leave from Denver and are outfitted by Vic Wolvin, Colorado Outdoor Educators, Inc.)

WHITE RIVER-SAN ISABEL WILDERNESS—July 8-12; July 28-Aug. 1. $195.

MUMMY RANGE WILDERNESS—June 23-July 1. $330.

COLLEGIATE RANGE WILDERNESS—July 2-6. $195.

NEVER SUMMER RANGE—July 14-18. $195.

recycled paper

THE CATCHALL

Attempt to Stop Waterfowl Hunting Stalled

Protectionists in New Jersey have reached a tentative agreement with the Department of Interior and temporarily dropped their suit to prohibit waterfowl hunting in the United States, the Wildlife Management Institute reports.

The protectionists filed a suit early in October requesting a temporary injunction to prohibit federal officials from allowing a waterfowl hunting season in 1974 on the grounds that no environmental impact statement (EIS) had been filed. They also claimed that even if an EIS had been filed, the season should still be closed because of adverse effects of lead poisoning, the downward trend of black duck populations, inability of hunters to identify waterfowl species, insufficient data to justify king and clapper rail seasons, danger to greater sandhill and whooping cranes by an open season on little brown cranes and the effects of "a hunt of this magnitude" on "the ecological balance of the environment."

Plaintiffs in the case included Wildlife Preserves, Inc., the New Jersey branch of the Humane Society of the United States, Fund for Animals, Inc. and Deer-Ecology-Environment-and-Resources, Inc.

The plaintiffs offered to drop the case if the Department of Interior agreed to a series of demands. Interior refused and offered a counterproposal which the plaintiffs accepted. In return for dropping the suit, Interior agreed to: (1) seek authority from Congress to require all persons hunting waterfowl to purchase a duck stamp, (2) invite the public to all waterfowl advisory council meetings, (3) encourage better state enforcement of waterfowl regulations, (4) attempt to simplify waterfowl regulations, (5) prepare a "programatic" EIS on the 1975-76 hunting season that can be revised easily in succeeding years, (6) sustain an effort to improve hunters' ability to identify waterfowl species and (7) consider five "substantive" points raised by the plaintiffs which include lead poisoning, black duck and king and clapper rail population declines, the point system and exposure of whooping cranes to shooting.

If Interior does not carry out its part of the bargain to the protectionists' satisfaction, the suit may be filed again.

FAMILY FARMS

Concerned about the gradual takeover of the family farm by corporate agribusiness? If so, you might want to become involved in a statewide conference on the subject. For information, contact Bill Walker, Box 1311; Missoula, MT 59801.

REPORT WOLVERINES

If you take a wolverine, the Montana Department of Fish and Game would like to know about it.

Live wolverines must be reported within 10 days after capture and dead animals must be reported to a department employe within 30 days, according to a recent ruling adopted by the Commission.

Information gathered will help determine the status and distribution of this large North American member of the weasel family.

Never numerous, large home ranges and solitary behavior probably contribute to a natural sparsity. By 1920, wolverines appeared near extinction in most of Montana. By 1940, they began to increase their range in suitable habitat once again.

Over the last 10 years, an average of 24 animals has been taken annually by hunters and trappers.

SUMMER OUTDOOR COURSES

Two courses in outdoor recreation will be offered during the 1975 summer session at the University of Montana, Missoula. The courses are designed for teachers, naturalists, recreation leaders and others involved in administration or operation of outdoor programs.

"Leadership Techniques and Survival Skills for Wilderness Backpacking" (HPER 460) will run June 16-20. Classes in "Organization and Leadership of Outdoor and Wilderness Pro-

SPRINGBOARD

"The most frightening thing about the current wave of anti-hunting propaganda is that hunters are not frightened!

"Talk with hunters across the country and you'll find that six out of ten of them 'didn't know there was a serious, organized effort to ban hunting.' Nine out of ten of them, assured that this is true, say, 'But, man, they can't do that! They can't tell me I can't hunt! Hunting is an American tradition.'

"We thought nobody could tell us what we could or could not drink, too. But they passed the Eighteenth Amendment. The movement to ban hunting is real, is strong, and is growing. And its threat is doubled by our ignorance of it, redoubled by our failure to take it seriously."—*E.B. "Bev" Mann, "Our Endangered Tradition,"* Field & Stream, *January 1975*

FOR DISCUSSION

recycled paper

grams" (HPER 441) will run July 24-30, plus a required practicum with variable credit.

Participants will discuss wilderness leadership, trip organization, backpacking equipment and camping techniques. Both courses include field trips. For additional information, contact Dr. Joel F. Meier, director, Studies in Recreation; University of Montana; Missoula, MT 59801.

COAL DEVELOPMENT CAUSES DROUGHT?

Southeastern Montana coal development may cause drought and millions of dollars of crop losses downwind, says Dennis Arnett, director of the Institute of Atmospheric Sciences at the South Dakota School of Mines.

Arnett says the tiny particles produced by steam generating plants cause water vapor to condense in droplets too small to fall from the sky. He estimates that rainfall in the Dakotas could decrease by as much as 10-15%.—*High Country News*

JUST ANOTHER WILDERNESS USE

Sometimes the tedious task of reviewing environmental impact statements has its own unexpected rewards. Consider the following findings of a Natural Resources Law Institute researcher who was reading through comments on the Atomic Energy Commission's draft EIS on managing nuclear wastes. This solution was offered to the "vexing problem" of storing radioactive wastes. It was suggested by Carroll Rogers, Jr., of Spruce Pine, North Carolina:

"It is my suggestion that since so many areas of public lands, and even many areas which are not public lands, are being declared 'wilderness areas', that these offer ideal places to store radioactive wastes, since they will not be traversed by more than a few hikers who could be protected by fences around the stored radioactive wastes.

"Specifically, it was my suggestion that on each 100,000 acres of

continued

Hook Removal—Standard

1

A hook buried in a finger, or in any other part of the human frame, is no pleasure. It will hurt and it will have to be removed. If there are no doctors around, you may have to do the job yourself. The push-through method is time-honored.

2

A gritting of teeth may help, and there'll be some pain, but who asked you to stick a hook in your finger in the first place? Just push the point on through in a natural curve until the barb emerges. Once this is done, the worst is really over.

3

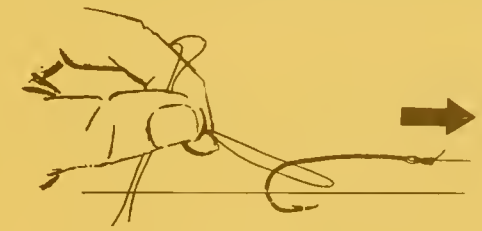
Now it's all downhill. With cutting pliers, snip the barb off. You did have cutting pliers in your kit, of course! How else could you make leaders and repair tackle! Pliers are tools for all sorts of things, although we hate to use them in this way.

4

Now there's nothing to it: simply slide the barbless hook shank back through the wound. You'll bleed a little. But, if you keep the wound clean, and if your tetanus shots are up to date, you'll survive.

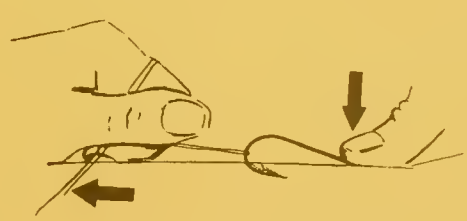
Hook Removal—Snatch

1



Loop 20- or 30-pound test line around the curve of the hook and get a good grip.

2



With thumb of other hand, press hard on the head of the hook for direct pull.

3

Try to guide barb back along the pathway of entrance. Quick! Snatch it out!

courtesy of *Texas Parks & Wildlife*

recycled paper

wilderness areas, a small acreage near the center of such tracts be set aside for storage of radioactive wastes and adequately fenced to prevent accidental trespass by the very occasional hiker who might penetrate this deep into a wilderness area.

"The small disturbance to the wilderness area of an adequate access road and the very nominal acreage required to store a substantial amount of radioactive waste would in no way impair the quality of the wilderness area, which at best is going to be of use to only a very few citizens of this country because of its inaccessibility."—adapted from *Earthwatch Oregon*

A 700-POUND POINTER NAMED SLUT

For centuries, pigs have been used in France for sniffing out truffles, a tuberous, underground fungus highly esteemed as a gourmet fare. But, to think of a pig being trained to retrieve game birds is to really test a man's credibility.

Yet it has been done.

One such pig was a sow named Slut who achieved fame as a hunting pig in the early part of the 19th century, according to the B.C. *Wildlife Review.*

Slut came on the scene by accident in the New Forest of southern England when, as a semi-wild animal, she accepted food from a gamekeeper. He was training an indifferent bunch of dogs at the time, and—just to see what would happen—began using his training methods on the pig.

To his astonishment she was more adaptable than the dogs and was reportedly working as a first-class retriever within a few weeks.

Slut was versatile. On a single day she was known to find and point partridge, pheasant and rabbit. She could even point jacksnipe—a true test of a pointer's skill. She could point a partridge 40 yards away. By the time she was five years old, Slut was a celebrity, and people came long distances to see her in action.

FREE SIGNS

Great Falls regional department personnel are trying to open more land to public recreation by providing several different signs to landowners.

For example, a green sign designates the land open to hunting without asking permission, with several conditions.

A yellow sign indicates permission is needed to hunt. However, the landowner's name and location are listed on the sign, so the hunter can find him.

The department gives the landowner a supply of recreation permits that the rancher or farmer can, in turn, give to each hunting party. The landowner keeps a duplicate of the permit and extra space is provided so he can write in additional stipulations.

Additions and improvements are planned for 1975 signs, according to Harley Yeager, Region 4 information officer. The signs will be larger, brightly colored and thus more easily read by hunters, he said.

RECREATION PERMIT Number _____

Permission is granted to _____

_____

to enter my land, under the following conditions, for recreation.

Dates valid _____

Signed _____

1. Landowner assumes no liability. Sec. 67-808 R.C.M.
2. No driving off established roads unless consent signed here _____
3. Close all gates you open, leave no refuse, stay away from livestock, equipment, and buildings.
4. Build no campfires unless consent signed here _____
5. _____
6. _____
7. _____
8. Violation of any of the above conditions, altering dates, or otherwise changing this permit renders it void. Permittee agrees to show this permit to anyone requesting it.

GREEN SIGN AREA

RECREATIONAL USE OF THIS LAND IS ALLOWED UNDER THE FOLLOWING CONDITIONS:

1. Landowner assumes no liability. Sec. 67-808 R.C.M.
2. Drive only on established roads.
3. Close gates you open, leave no refuse, stay away from livestock, equipment, buildings.
4. You need not apply for permission.

_____

_____

YELLOW SIGN AREA

RECREATIONAL USE OF THIS LAND BY PERMISSION ONLY. APPLY TO: _____

_____

_____

_____

_____

_____

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She became fat and slothful later in life and died when 10 years old, weighing 700 pounds.—*Conservation News*

CLUB REFUTES INDUSTRY'S CLAIMS

Sierra Club attorney H. Anthony Ruckel has called for a halt to strip mining in the Northern Plains until more is known about western coal's sulfur content.

Ruckel said the club has developed evidence refuting industry claims that "low sulfur" western coal can be burned without costly sulfur dioxide emission controls.

He also said a federal study of "low sulfur" coal mined near Gillette, Wyo., revealed that 70% of the samples taken would exceed federal sulfur standards if burned in a power plant without sulfur emission controls.—*High Country News*

MORE FERRETS FOUND

A University of Wisconsin biologist, Tim Clark, says Wyoming has a small population of black-footed ferrets, America's rarest mammal. Since 1970, 44 ferret sightings have occurred in Wyoming. Previously, it was thought the endangered ferret only inhabited prairie dog towns in western South Dakota.

The last verified ferret sighting in Montana was a road kill in the late 1950s.

HOW CITIZENS VIEW LAND USE

Results of a questionnaire distributed at nine regional land use workshops throughout Montana (Oct.18-Nov. 1, 1974) show both similarity and disparity of attitude toward major land use issues.

For example, strong agreement exists—from 85% at Billings to 60% at Havre—that Montana is losing too much of its farmland due to land use changes. On the other hand, Montanans' opinions vary widely on the question of encouraging economic growth; 92% of those surveyed in Wolf Point believed it should be encouraged, down to 22% in Kalispell.

continued

contributors

Get two or more waterfowl hunters together and the odds are 10-1 they won't talk much about the steel vs. lead shot question. Yet, it's a controversy that could have great effect on their sport. What happens if the strict U.S. Fish and Wildlife Service proposals are implemented? Just how much waterfowl mortality does lead shot actually cause each year? Will steel shot ever be as ballistically effective as lead? **Dale Witt** weighs the advantages and disadvantages of each in his article, "The Steel Shot Gamble," on page 2. Witt joined the department in 1952 to conduct statewide bird surveys. He served as a game management biologist in Malta from 1953-1957 and has been the department's waterfowl specialist at Freezeout Game Management Area since 1957.

Even though it holds a high place on the evolutionary scale, the sandhill crane resembles a long-legged, gangly throwback to prehistoric times. With its eerie, haunting calls, it manages to elude many hunters because the calls are nearly impossible to duplicate. Plus, when it comes to decoys, cranes are among the most discriminating birds—they may circle and soar for many anxious minutes if they don't like what they see. The familiar **Ken Walcbeck** byline appears on the sandhill article, beginning on page 6. Walcheck is the department's information officer for the Miles City region. He holds a B.S. in wildlife conservation and biology from Wisconsin State University and a M.S. in applied science (ecology) from Montana State University, Bozeman. He formerly taught biology at Northern Montana College.

With this issue, **Harry Engels** and his camera join *Montana Outdoors* contributors. Engels' photographs of the sandhill crane appear on pages 6,7 and 10. Working from his darkroom in Livingston, Engels' shots have appeared in the "Encyclopedia Britannica," *Reader's Digest*, as well as cover and inside photographs in *Ranger Rick* and *National Wildlife*. His address is: Box 1320; Livingston, MT 59047.

An earlier article on mushroom hunting generated so many requests for copies and reprints that we decided to devote an entire Recreation Guide to the ever-growing pastime. We're pleased to welcome **Frances V. Davis** of Otis Orchards, Washington to *Montana Outdoors*. One of the organizers of the Spokane Mushroom Club, Mrs. Davis is also affiliated with the North American Mycological Association. She joined the Photographic Society of America in 1970 and now holds a 3-star rating with that organization—as evidenced by several of her photographs accompanying the article and the front cover of this issue. Turn to the Recreation Guide on page 19 and learn some secrets of a professional fungi sleuth.

Decker-Birney, Bull Mountains, Sarpy Creek—they're more than just names on a map to **Bob Martinka**. He heads the department's coal and energy studies for eastern Montana and coordinates the research efforts of fisheries specialists, migratory bird experts and game management biologists. In his article on page 28, he explains the goals of each project and why the department is involved in the controversial energy development issue. Martinka holds a B.S. in wildlife management from Colorado State University, a M.S. in wildlife ecology from Purdue and a Ph.D. in fish and wildlife management from MSU.

It doesn't have to register -10° for hypothermia to pose a serious and silent threat to unprepared recreationists. **Don Malmberg** presents basic information about hypothermia and gives a few of the warning signals and symptoms. Every person who spends time outdoors should be familiar with preventive measures. The department's boat and snowmobile safety officer, Malmberg previously served as a game warden in Great Falls and as the warden training officer in Helena. A former diver for the U.S. Navy, he now scuba dives and also enjoys boating, cross-country skiing, snowmobiling, hiking and other outdoor activities.

If you're interested in reading about what happens when federal and state agencies work together to benefit wildlife, turn to page 38. In his article, "From Dust to Ducks," **Don Childress** traces the history and progress of the Canyon Ferry Unit Dust Abatement Program. Instead of blowing dust and a sterile, exposed lakebed, the area will provide nesting islands for Canada geese and other waterfowl and an aquatic food source and resting area for migratory and nongame birds. Construction of four silt-retention dikes also presents an opportunity to study the sequence of plant, insect and wildlife development in the area. A game management biologist for the department, Childress holds B.S. and M.S. degrees in fish and wildlife from MSU and previously worked at the Freezeout Game Management Area.

recycled paper

Approximately 2,000 persons attended the workshops which were funded by a grant from the Montana Committee for the Humanities and planned by a committee of 24 governmental and private organizations. About 1,047 persons completed the questionnaire containing 28 statements on land use issues. Five possible responses ranged from "strongly agree" to "strongly disagree." Because the questionnaire was administered to only those willing to fill it out, results do not represent a statistically valid sample of public opinion in Montana. However, they *do* indicate general attitudes toward land use and enable inter-regional comparisons of these attitudes.

About two-thirds of the respondents were male, with agriculture the most frequently named occupation (84% at Lewistown, for example). Many persons answering the questionnaire (87% at Wolf Point to 40% in Missoula) have been Montana residents over 25 years.

Some respondents indicated that too many people were moving into their respective areas too quickly—although this feeling varied from only 9% at Wolf Point to 74% in Kalispell. On the other hand, very few felt that Montana's population was too high.

The feeling that environmental controls are necessary was widespread, but it was generally agreed that too many agencies deal with land use.

An average of 68% of the respondents felt that too much land was being subdivided in Montana's rural areas; responses ranged from 80% in Missoula to 44% in Wolf Point.

The survey also revealed that most respondents identify the natural features and values of Montana as important parts of their life style and are willing to give up higher incomes elsewhere to live here.

A very limited supply of the detailed questionnaire results, region by region, is available from Bill Cunningham, Department of Natural Resources and Conservation, 32 South Ewing; Helena, MT 59601.

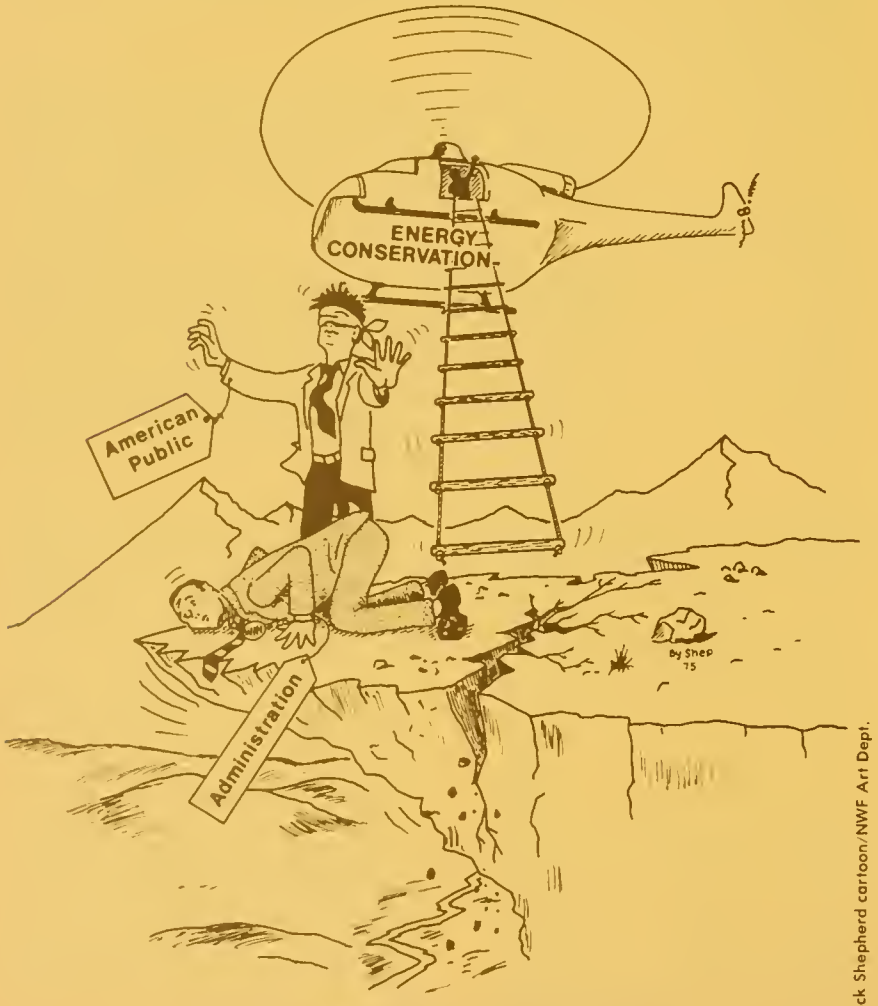
PAPER FROM THE BUREAUCRATIC FORESTS

In some circles, bureaucrats are collectively called "paper pushers." Montana has a special kind of paper pusher. They're pushing computer cards and printouts, used bond paper, newspapers, old memos and letters into boxes, and the result is not only cash but saved trees.

In July 1974, Gov. Thomas L. Judge asked state employes in Helena to begin salvaging recyclable paper. The program is still going strong and according to Karen Miller, mail and messenger supervisor for the Department of Administration, nearly every state agency participates. The Montana Legislature generates its share of recyclable paper and Ms. Miller said another person had to be hired to handle the extra load during the session.

About 214,000 pounds of recyclable material had been gathered through mid-January, according to Vic Andersen, sanitarian for the Solid Waste Management Bureau of the Department of Health and Environmental Sciences. But recent monthly averages reached about 50,000 pounds due to increasing cooperation and the legislature.

Agencies are asked to (1) separate the computer cards and printouts from everything else, (2) bundle newspapers separately and (3) call Ms. Miller's office when a box or two is filled.



A Jack Shepherd cartoon/NWF Art Dept.

An ungainly position

recycled paper

Once a month, a truck loaded with paper goes to Denver. A firm there sorts and separates it further, tying it into high-density bundles about the size of an office desk, each weighing half a ton. The bales are then sold to various commercial firms—for example, old computer cards might become new computer cards, used newsprint might become tomorrow's daily paper. Some of the general material that can't be sorted into specific categories is made into a low-grade cardboard.

Through mid-January, the program made $2,270.22. That means it partially supports itself, in terms of paying someone to pick up the paper and load the truck. And, plans are under way to make the loading operation more efficient, Andersen said. He said the material will be placed on pallets and then fork-lifted into the truck.

Maybe 214,000 pounds over a seven-month period doesn't sound like much. But it represents 2,033 trees that won't have to be cut or a heat value of 1.4 billion BTUs, Andersen said.

Gov. Judge was right when he said the salvage operation would (1) conserve energy otherwise required to produce more paper, (2) conserve natural resources needed to produce new paper and (3) assist in reducing the need for additional landfill disposal areas.

The right kind of paper pushing does indeed have many benefits.

• *The recycling item and the accompanying information on the statewide land use questionnaire are merely two examples of activities that, at first glance, don't seem to affect wildlife. But when we talk about recycling paper, we're talking about logging, and when we're talking about land use, we're talking about rural subdivision, stream channelization and water pollution. And, in turn, we're talking about wildlife habitat destruction.* —Ed.

WHERE DO WE GET ELECTRICITY?

During last winter's fuel shortage, the General Electric Co. conducted a nationwide survey which found that many Americans lack knowledge of electricity sources. In part, the results indicated:

• One of three persons questioned could not name a single fuel used to generate electricity.

• Six of ten didn't mention coal, even though it's the most commonly used fuel.

However, with the present furor over the Colstrip development, we bet most Montanans know wildlife habitat and ranchland is strip mined and the coal burned to generate the "clean" energy in the kitchen outlet.

SPRINGBOARD

"Like winds and sunsets, wild things were taken for granted until progress began to do away with them. Now we face the question whether a still higher 'standard of living' is worth its cost in things natural, wild and free. For us of the minority, the opportunity to see geese is more important than television, and the chance to find a pasqueflower is a right as inalienable as free speech."—*Aldo Leopold*

FOR DISCUSSION

SKI DEVELOPMENT LIMITS DEER HERD

During the past 20 years, critical big game winter range has been reduced by 89% in Pitkin County, Colo., home of the Aspen ski resort. As a result deer herds are down 31%, according to Ray Boyd, a researcher for the Colorado Division of Wildlife. The division's environmental impact study of the area states that the remaining critical range "must be preserved intact for the survival of the wildlife involved . . . All dwellings should be prohibited, and other structures should be permitted only after review and approval of the Colorado Division of Wildlife."—*High Country News*

ENDANGERED PLANTS

We hear a great deal about endangered species nowadays but never—or, at least, rarely—anything about rare plants.

Now, however, the Smithsonian Institution has compiled a list of endangered plants which, almost unbelievably, numbers about 2,000 species and accounts for almost 10 per cent of the plants in the U.S.

Botanists from all across the country helped the Institution with the list which will be

continued

MOVING?

If you're planning to move in the near future, please attach the label from your last issue and send it and your new address to *Montana Outdoors*, Department of Fish and Game; Helena, MT 59601.

NEW ADDRESS:

Name _____

Address _____

City _____ State _____ Zip _____

recycled paper

published in full this year under provisions of the federal Endangered Species Act.

MORE ANTI-HUNTING FOR YOUNG STUDENTS

Last year we cited an article, "Hunting for 'Fun'—Should We End It?," which appeared in the Feb. 5, 1973 issue of *Science World*, a weekly periodical circulated in the nation's secondary schools. The article was a bitterly biased piece against hunting and game management, and concluded with the question: "Does hunting have a value to people and to our environment? Or is it a type of savagery that should be ended?"

Now comes another slap at hunting from the editor of *Highlights for Children*, a monthly magazine endorsed by many secondary school systems. In the June/July 1974 issue, a Texas schoolboy asked the editor: ". . . Don't other animals give us other things besides the sport of killing? Do I have to sit back and watch, or can I do something about it?"

The *Highlights* editor replied: "We are very glad to hear from you and to know you are so concerned about the killing of wild animals. More and more people have this concern and if we keep speaking out against it, I am sure that eventually needless killing can be stopped.

"I am afraid that there is not much that any of us can do, but by expressing our point of view, I am sure that collectively we can eventually get laws passed which will stop needless killing. You must be a very mature young man to express yourself so well."

The issue's masthead lists the editor of *Highlights for Children* as Walter B. Barbe, Ph.D. 803 Church Street; Honesdale, PA 18431.—*John Madson, Conservation Department, Winchester-Western*

HELPING THE ENERGY CRISIS?

Gulf Oil was somewhat embarrassed recently when, after forcefully arguing that it needed increased tax breaks and higher profits to stimulate further capital investment, it was announced that the company has just bought the Barnum and Bailey Circus.

POWER LINES PACK MORE THAN A WALLOP

Scientific literature indicates that the effects of high voltage transmission lines have not been adequately studied in the U.S. However, a much more thorough examination of these associated problems has been conducted in Russia, according to an article in the Oct. 15, 1974 *Conservation News*, a newsletter published by the National Wildlife Federation.

In 1962, after the first Russian 500 kv lines had been operating for several months, men working at the substations began to complain of headaches and a general feeling of malaise. They associated these symptoms with exposure to the electric fields, the federation reported.

The Russians then made a long-term study of 250 men working at extra high voltage substations. These results were compared with medical examinations of men working at lower voltage substations.

The studies concluded that long-time exposure to intense electric fields without protective measures resulted in "shattering the dynamic state of the central nervous system, heart and blood vessel system, and in changing blood structure. Young men complained of reduced sexual potency," the article said.

As a result of these tests, the Russians have set up safety standards for maximum exposure to strong electric fields. The fields which they begin to consider dangerous are approximately those that will light up a fluorescent light bulb—without benefit of batteries, cords or other conductors—as it's held in your hands while standing under a high voltage power line.

A farmer on a tractor under a 765 kv line is exposed to fields so strong that the Russians would not allow such exposure.

The article concluded, "In this country, we believe that we have more respect for human rights and human life than the Soviets have, yet we have not made as much effort as they have to protect people from this type of damage."

ONE OF TODAY'S BETTER BARGAINS

We've resisted, but we can't last any longer. Faced with increased production costs—paper, printing, labor and just about everything that makes a magazine—we're forced to raise the price of *Montana Outdoors*. Effective July 1, 1975, the $2 per year fee goes to $3 for one year, $5.50 for two years and $8 for three years.

As we've stated many times, we aren't trying to make money with *Montana Outdoors*, only recover some of the cost of producing it. However, galloping inflation—a common problem—makes it increasingly difficult to meet this goal. So we've decided to raise the subscription rate slightly.

Even with higher subscription prices, we still think MO is one of today's better bargains. Hopefully, you'll agree.

Get your order or renewal in before July 1 to take advantage of the $2 rate. With a three-year subscription for yourself, you receive a free copy of "Savoring the Wild," our fish, game and wild plant cookbook. If you order a three-year *gift* subscription for someone else, *only* the recipient receives the cookbook.

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MUSHROOM FASCINATION

by Frances V. Davis

Searching the fields and forests for edible fungi is a very pleasant pastime, especially when you often find something delicious and absolutely free.

Mushrooms have a fascination all their own. Imagine a mushroom emerging overnight from the duff of the forest floor, only to disappear as quietly as it appeared, leaving little visible evidence of its existence. Envision one so sturdy that it pushes itself up through a blacktop roadway. Then, imagine a mushroom that glows in the dark.

Even before the wild mushroom was given the

continued

Author's husband, Leslie, with a basket of shaggy manes. Below, small puffballs. photos by Frances V. Davis

foreboding title "toadstool," it had been wrapped in the mysteries of witchcraft, trances and religious ceremonies of native tribes of various countries. Ancient Greeks and Romans talked of mushrooms and even Shakespeare reflected on the evils of the lowly "toadstool." Thus, many people touch some of the unfamiliar growths encountered in the field or forest with great apprehension.

Today, however, mushroom fanciers shrug off this ominous reputation. Instead, they know mushrooms for what they really are—a good chance for an outdoor excursion and great eating.

RECOLLECTIONS

As long as I can remember, I have eaten mushrooms. I started with the common meadow mushroom (*Agaricus campestris*). To me, this *was* mushrooms. My undaunted quest for their hiding places was uppermost in my mind each year.

In good years, the mushrooms were abundant for several weeks. But at other times, I could barely find enough to satisfy my taste buds. Those were the times I was selfish with my precious gatherings.

For years, I suffered from the illusion that the meadow mushroom was the only edible variety. Then, a few years ago, a neighbor brought some "things" for us to eat. I gingerly tasted a sample—not the same as my meadow mushrooms, but palatable, to say the least. As the years went by, I discovered and enjoyed numerous edible varieties of wild mushrooms.

LIFE CYCLES

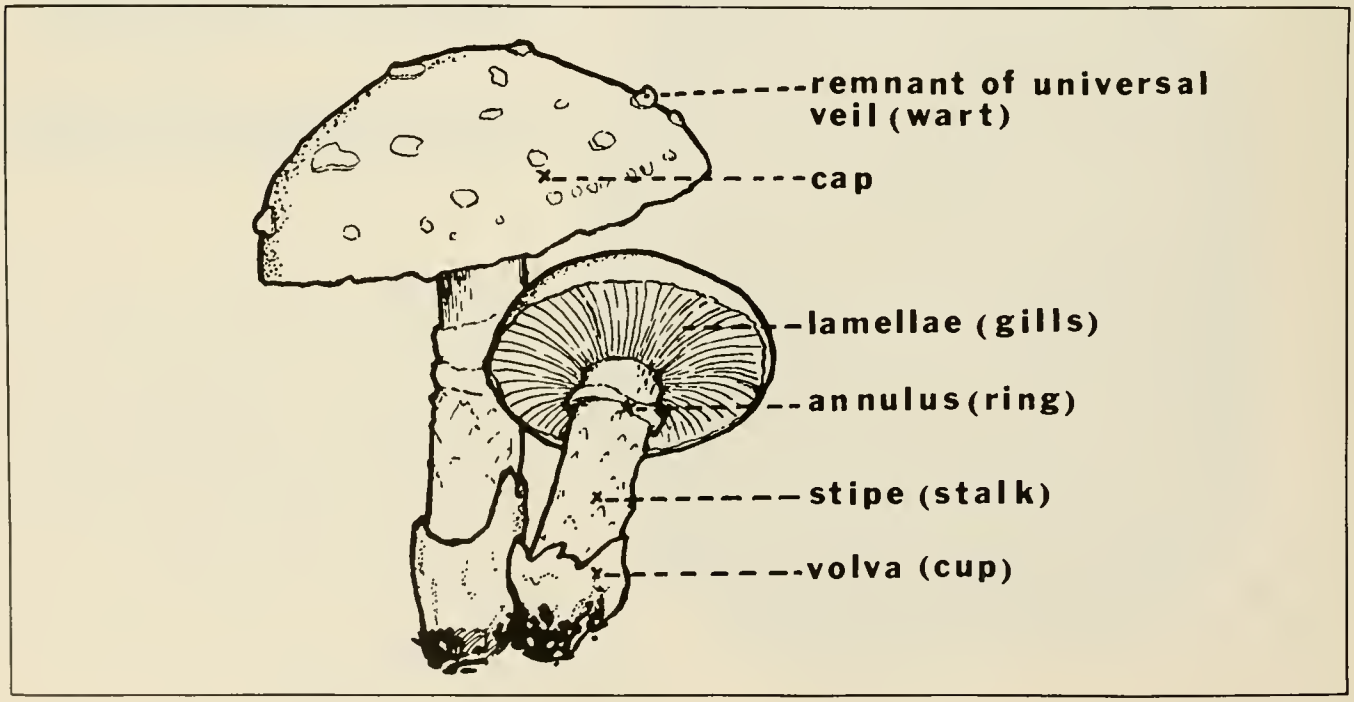
How do these delicious fungi grow? The mushroom's life cycle begins with spores carried by gentle breezes. When a spore falls on a suitable spot, it germinates and sends out fine threads (mycelium) which resemble gossamer. These threads serve some of the same functions as roots in green plants. (A few such threads are called hyphae, while a mass of threads is called mycelium.) The mushroom develops from the mycelium. The only function of the fruiting body (the mushroom we see and eat) is to produce another crop of spores and liberate them into the air.

The mushroom appears so quietly and sometimes so quickly that it seems almost instantaneous. However, it may not attain its full growth for many days. Some species are short lived and others retain their shape and color for months, dry to the hardness of wood and remain on a tree trunk for several years. The latter add new growth rings each year.

SAFETY

When gathering mushrooms, remember some simple rules. If possible, go with an experienced hunter the first few times and take along several mushroom books for cross reference. Work with one species at a time, beginning with the more common mushrooms, and wrap those growing together and considered to be of the same species in a single piece of tissue or waxed paper. Include the base of the plant for identification help. Jot down details of the find, including a description of nearby plant life, to aid later identification. Every piece of information may be necessary for identification.

After you get home, make drawings of the plant and check a section cut through the long or vertical axis of the fungi. Check the wrapping paper for spores and make a spore print, an essential step in identification for the beginner and professional alike. (Cut the cap from the stem and place it gill-side down on a piece of white paper. In several hours, the spores will be deposited on the paper. It is usually desirable to place cap and paper under an inverted cup or bowl so



that drying is not too rapid. Record the color of the spores. And then refer to an authoritative identification guide.)

A precautionary note seems essential at this point. For safety's sake: (1) Never eat an unidentified mushroom; (2) learn to recognize poisonous species, particularly in *Amanita*, and (3) when trying a new mushroom, eat only small portions.

After cooking mushrooms, each member of the party should make his own taste test since some people are allergic to some mushrooms. Cook each species separately and eat only one species at a sitting. Different species have distinct tastes that can't be enjoyed if their flavor is drowned by another mushroom. And, too, the responsible species will be pinpointed should a reaction occur. Since some severe poisoning reactions are slow to develop, one should not eat a second sample of a new mushroom within 24 or more hours.

Never assume all mushrooms growing together are of the same species. Always check each plant for distinguishing features. (A variation in size can be expected.)

Take along a sharp knife, a trowel, tissue or waxed paper, a few small containers for the more delicate specimens, several guide books and note paper for identification and description.

FUNGI FLOWERS

The best times to hunt mushrooms are spring and fall. The common morel (*Morchella*) is one of the earliest edible mushrooms. (However, in many areas of Montana, oyster mushrooms might precede the morels.) Not plentiful every year, morels are found in a variety of places, including burns in the spring following a forest fire. The mushrooms are ready as early as the end of April, to late May or early June, depending on elevation and other seasonal factors. Morels are also commonly found under conifers and in other kinds of woods—for example, the cottonwood forests of river bottoms. The morel pushes up the dry, dead leaves, looking much like a small pine cone. An eagle eye is needed and a gatherer must "tune in" his eyes to spot this easily overlooked mushroom.

The morels are characterized by a creamy, hollow stem which supports a light tan to deep brown ridged, pitted and often cone-shaped cap. Once clearly identified, morels cannot easily be confused with other mushrooms.

Early spring will also produce puffballs, with one of the earliest to appear being *Calbovista*. In late spring, perhaps one may begin to see *Lycoperdon pyriforme* which slightly resembles a golf or ping-pong ball. It may be found throughout summer and fall, depending on the amount of moisture. Sometimes rather pear shaped, it varies from white with a beaded surface to tan with a smooth surface, and from marble to golf ball size. It grows on decaying wood.

Special thanks to Dr. Mel Thornton of the University of Montana Botany Department for his assistance and advice.—Ed.

MINI-EDITORIAL

Mushroom hunting provides an opportunity for an outdoor experience most families can enjoy together. But if you have small children, warn them (and then warn them again) not to put *anything* they find in the forest into their mouths without showing it to you first. The forest has flowers, leaves, roots, bulbs, berries—and mushrooms—that are potentially lethal. If your child is old enough to understand and follow your directions, teach him never to put any part of a strange plant into his mouth. If he's not old enough to understand, please leave him at home until next year.

Among the puffball species, the *Calbovista* and *Calvatia* genera produce very large examples, sometimes growing to washtub size. They are usually whitish, with either smooth or rough skins. Look for them around old barns or outbuildings, in a pasture or sometimes even along rocky river banks. They are edible, as long as a crosswise cut shows the interior is firm, pure white and the consistency of cream cheese. They should have no indications of stems or gills. A large *Calvatia* can produce a man-sized mushroom steak.

The fleshy pore mushrooms (*Boletus* and others) encompass many species. When in prime condition, they provide fine eating—and few of this family are poisonous. However, they decay rapidly and are often worm-riddled. Collect boletes during late spring, summer and fall during warm, wet weather. They often grow under conifers and are easily recognized by a porous layer of bright yellow, occasionally cream to grey, on the cap's underside. The tubes vary in size and shape—some have smooth, slippery caps while others are rough and fluffy. Those with red tube mouths should be avoided.

Boletus edulis is the most sought after fungus in this family. The cap may be slightly sticky when fresh. It is usually a crusty brown color, but the shade varies. A weighty mushroom, not many are needed for a meal. It may appear in mid-June, about the time Mountain Ladys-slippers bloom. Look for *Boletus edulis* in coniferous forests.

The coral mushrooms (*Ramaria*, *Clavaria* and others) are available throughout spring, summer and fall. Appearing in shades of cream, yellow, pink and lavender, look for them in mossy spots in the duff under evergreens. Not at all like conventional capped fungi, they instead resemble ocean coral. Only a few species of this plentiful family are inedible. They are not common in Montana.

AUTUMN ARRAY

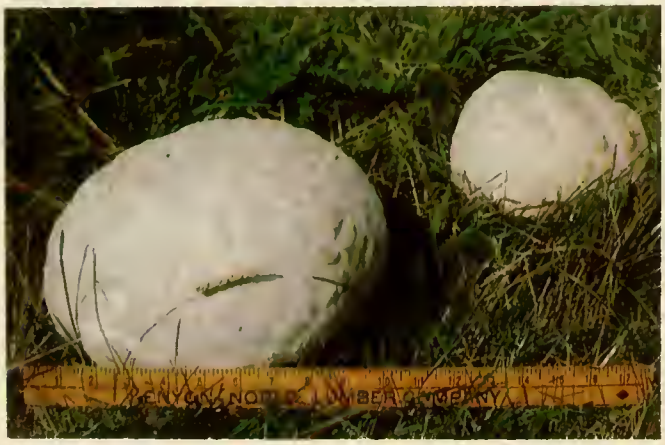
Autumn rivals spring in producing "flowers of the fungus world," as colorful and varied in form as any true flowers. Some of autumn's mushrooms might even be *more* colorful. To chance upon one of the

continued

meadow mushroom (*Agaricus campestris*) F&G photo by Jim Ford

black morel (*Morchella angusticeps*) photo by Frances V. Davis

oyster mushroom (*Pleurotus ostreatus*), edible and good. White gills, always found growing from old cottonwood or alder logs, usually in clusters. Found in early spring and early fall or in summer during a wet, rainy season. If a log is picked up and taken home, placed in shade or in basement and watered frequently, fruits will continue to grow. Use only young, tender caps. F&G photo by Tom Warren



giant puffball (*Calvatia booniana*) F&G photo by Jim Ford

golden chanterelle (*Cantharellus cibarius*) photo by Frances V. Davis

king bolete (*Boletus edulis*) photo by Frances V. Davis

(*Polyporus sulphureus*) photo by Frances V. Davis

clustered Collybia (*Collybia acervata*), edible and good. Found in clusters growing from the base of living trees, decaying logs or buried pieces of wood. Found in late summer and early fall in the moist coniferous woods of western Montana. Caps vary from honey color to light brown. Stems usually tough and stringy. Caps flatten with age. photo by Jon Cates

shaggy manes (*Coprinus comatus*) photo by Frances V. Davis

inky caps (*Coprinus atramentarius*) F&G photo by Jim Ford

huge, orange polypores—*Polyporus sulphureus*—growing on a rotting log, or perhaps high on the side of a dead snag, is quite an awe-inspiring experience. The glowing shelves (layers)—overlapping each other, edged with golden yellow, often with moisture drops sparkling in the sun—are a sight to behold. *Polyporus sulphureus* is sometimes called "chicken of the woods," since the flesh resembles a chicken breast in texture. About an inch of the edge will be tender enough for consumption. However, if you find a very young, fresh example, it is possible to eat the entire plant. Some weigh 10 pounds and fill a good-sized water bucket. Use it stewed, creamed, chopped and made into croquettes, in soup, or combined with chicken or other meat. It usually requires more cooking than other fungi.

You might be lucky enough to find a luminous, white feathery hydnum, *Hericium coralloides*. This is a mushroom that truly could be classed with the flowers. With myriad icicle-like teeth, one wonders how it can possibly be a true fungus. And it's not just beautiful; it's also delicious.

Many fungi grow in close association with certain trees and plants, a mutual relationship called mycorrhiza. Some grow only under pines, while others prefer firs or larch. Some grow on hardwood logs, while others single out members of the cottonwood family. Therefore, tree and plant identification must be studied in conjunction with mushroom identification.

An example of an autumn fungus which forms mycorrhizae is the honey mushroom (*Armillaria mellea*). The color is said to vary according to whether the fungus grows on a conifer or a hardwood. It has a tan, scaly cap, with a darker spot in the center. The gills run a short way down the stem and it has a ring which may dissipate with moisture. The honey mushroom provides excellent eating.

A few mushroom species prefer open ground, away from all trees. The most common of this type is my old fall favorite, the meadow mushroom. It prefers well-cropped cow or horse pastures or even golf course greens. The best known of this family is *Agaricus bisporus*, the commercial variety sold in stores either fresh or preserved.

The shaggy mane (*Coprinus comatus*), a member of the inky caps genus, is one of the most prolific mushrooms. They are available for several weeks in the fall. Look for them bordering a paved roadway, standing in groups like a bunch of chatting children passing on a secret. Apparently, moisture runoff from the roadway starts growth. Often concealed partially by the grass, look carefully for them. Look for them, too, under the shrubbery in your own yard or along the edges of old logging roads. In the same "patch," some measure 6-8 inches tall while others peek from the ground, with bits of sand and gravel clinging to their tops like tassels on a cap. An older shaggy mane turns black and drips ink-like liquid from its mature cap, which curls at the edges and shrinks. When the gills are pure white, the flesh is solid and delicious either fried or baked in cream. Since development of this mushroom continues even after gathering, prepare it immediately or partially cook and freeze it.

Another member of the inky caps genus, *Coprinus atramentarius*, frequently dwells in the city. Look for it snuggling close to the base of a hardwood tree, such as a maple, oak or locust, or in the open. A short plump mushroom of silvery grey, it has gills so tightly packed they seem almost solid.

The chanterelles possess vaselike fruiting bodies, sometimes completely hollow. The outer surface has radial veins, ranging from nearly smooth to practically complete gills. If gills are present, edges will be blunt instead of sharp, as in the true gilled mushroom—a field characteristic that distinguishes it from other gill fungi.

The most important member of this family is the golden chanterelle (*Cantharellus cibarius*). It will be yellow to orange, have a fragrant odor, a smooth cap and long decurrent (descending) gills. Look for it in mountainous terrain under fir trees, nearly hidden beneath the green mosses. I have gathered this mushroom as late as mid-October, beside the same log, year after year. A delicious mushroom, try it canned or frozen. (It becomes too hard if dried and does not rejuvenate readily.) *Cantharellus subalbidus*, the white chanterelle, is easily as good and found in similar terrain.

Picking the mushrooms has no more effect on the mushroom plant than picking apples from an apple tree. The mycelium remain below ground as "spawn," so the mushroom continues to fruit in a given spot until the food supply is exhausted. Since fungi cannot manufacture their own food, most of them depend on the decaying material on the forest floor. Moisture plays a very important part in mushroom growth. Dry seasons result in poor collections, but a warm, wet summer will produce an abundance. Since the same species may be found in the same places year after year, remember exact locations.

Someone is sure to ask if animals also eat mushrooms. A recent experience left no doubt. After photographing an especially perfect specimen of a shaggy mane, we found it mysteriously missing on a return trip to the spot following lunch. We examined the ground where it had been growing and observed a cow's track. We saw the animal a short distance up the trail.

Many times we spot mushrooms dangling from tree branches, as if hung up to dry. This is the work of a squirrel. When the food is thoroughly dried, the squirrel stores it for winter use.

Some readers might want to raise mushrooms at home, rather than going to the woods to search for the more elusive wild varieties. Kits are available at garden centers, or from mail-order sources. Don't try this on a large scale without careful research. Light, temperature, moisture and proper growing medium play important parts in the venture's success.

Searching the field and forest for the many different

kinds of mushrooms presents a great opportunity for an outdoor excursion. You also have the opportunity to familiarize yourself with other facets of the outdoors. No foolproof secret exists about where you can go and always find all the mushrooms your heart desires. Areas near woods, in forested mountains, along streambeds, in cow pastures or your own flower bed are likely spots to begin the search.

Our search starts each spring and continues until snow flies in early winter. Mushrooms grow much of the year and can be found depending on where you live, weather conditions and your desire to search them out. So, the next time you take off on a hike, look down and discover the fascinating miracles at your feet—mushrooms.

SUGGESTED REFERENCES

The following are suggested references for mushroom gatherers. Always take several along for cross reference in the field.—*Ed.*

"The Savory Wild Mushroom," by Margaret McKenny, revised by Daniel E. Stuntz

"The Mushroom Hunter's Field Guide," by Alexander H. Smith

"Mushrooms of North America," by Orson K. Miller

"A Guide to Mushrooms and Toadstools," by M. Lange and F.B. Hora

"Mushrooms of the World," by Lucius von Frieden

"Guide to Common Mushrooms of British Columbia," by R.J. Bandoni and A.F. Szczawinski

"Mushrooms and Toadstools in Color," by Else and Hans Hvass

"The Complete Book of Mushrooms," by Augusto Rinaldi and Vassili Tyndalo

COOKING THE WILD MUSHROOM

MUCH MORE THAN MUSHROOMS

2 c fresh mushrooms, sliced, preferably meadow (Chanterelles or *Boletus edulis* might be substituted.)
4 T butter
½ c *each*, onion, celery and green pepper, chopped
½ c mayonnaise
6 slices stale bread, preferably whole wheat
1 c sharp cheddar cheese, grated
3 eggs
1½ c whole milk
½ t dry mustard
¾ t salt
dash pepper

Saute mushrooms in butter 5 minutes. Add vegetables; cook another 5 minutes. Remove from heat and add mayonnaise. Oil inside of 2-quart casserole. Beginning with a bread layer, alternate layers of the vegetable mixture and grated cheese, saving some of the cheese for topping.

Beat eggs lightly; add milk, mustard, salt and pepper. Pour over the casserole and sprinkle remaining cheese on top. Bake, uncovered, in 350° oven about 45 minutes, or until custard is set and top lightly browned. Cool 5 minutes before serving.

SHAGGY MANES BAKED IN CREAM

Clean the shaggy manes. Slice in half, lengthwise. Layer in shallow baking dish. Pour 1 cup of heavy cream or 1 small can of evaporated milk over the top. Top with crumbled Ritz crackers and a small amount of grated cheese. Sprinkle with salt and pepper. Bake in 300° oven, uncovered, for about 20 minutes.

PICKLED MUSHROOMS

2 pounds (approximately) any good, solid fresh mushroom
¾ c vinegar
1½ c water
⅓ c sugar
1½ t salt
½ t ginger
1 t whole cloves
1 t whole allspice
garlic salt

Mix vinegar, water, sugar, salt and ginger and bring to boil. Clean mushrooms and place in large bowl. (Larger mushrooms may be cut into cubes.) Pour hot syrup over mushrooms and set aside until mushrooms shrink. Pack in small jars, adding one or two cloves, pinch of allspice and dash of garlic salt to each jar. Seal tightly with lids. Cure at least one week before using.

MUSHROOMS IN VERMOUTH

1 pound fresh button mushrooms (meadow preferred, either wild or commercial variety)
¾ c dry vermouth
⅓ c salad oil
4 T lemon juice
1 t salt
¼ t pepper
1 T onion, grated
1 T fresh parsley, minced

Clean mushrooms, cutting off stem tips. Combine other ingredients in a large bowl. Add mushrooms to marinade; cover and refrigerate 24-36 hours. Stir or shake bowl occasionally to blend flavors. To serve, drain and place in serving bowl; provide toothpicks.

PRESERVING MUSHROOMS

The easiest way to preserve the spring Morel is drying. Do not wash it; clean off surface debris, cut in half to inspect for insects, lay out on a window screen, either outdoors in the warm sun or indoors near direct heat. With good air circulation, they will dry in a few hours. When thoroughly dry, store in plastic bags or tightly closed fruit jars. When you want to use them, rinse well in warm water, then soak about 30 minutes until plump. Use as you would fresh mushrooms.

To can mushrooms, first blanch them either with boiling water or steam. (I prefer to steam them.) This reduces the water content and you can pack more into each jar. Process under pressure about 30 minutes.

Treat mushrooms for freezing the same way as for canning. The shaggy mane freezes especially well. Heat them slowly and they will make their own juice, which may be used when packing the freezing containers. Heat them until they begin to shrink. When thawed, dice them and make a delicious cream soup, to which may be added clams, potatoes or other vegetables. Some mushrooms become tough when frozen, so can them instead.

POLISH SAUERKRAUT

2 c canned sauerkraut
½ pound bulk sausage
1 c mushrooms, chopped (Meadow, chanterelles or *Boletus edulis* serve best.)
1 large onion, chopped

Boil sauerkraut until tender. Brown crumbled sausage until cooked. In separate skillet, brown the chopped mushrooms and onion. Drain oil from sausage. Drain cooked sauerkraut. Combine all ingredients. Serves 4.

MUSHROOM OMELETTE

It is usually easier to make several little omelettes than to cope with 1 large one. As a general rule, use 2 medium mushrooms for each egg. The mushrooms should be sauteed in a saucepan first.

To make the easiest 2-egg mushroom omelette, slice 4 mushrooms and chop them finely. Saute in 1 T of butter for 5-10 minutes. Stir into the eggs and proceed with the omelette.

If the mushrooms are to be enfolded by the omelette, slice the mushrooms—don't chop them—and then saute. Add them after the eggs have become firm on the bottom but while they are still moist on the top. Fold the omelette and serve immediately.

FRENCH FRIED PUFFBALLS

Cut mushrooms in ½-inch slices, making sure they are thoroughly dry. Fry in hot vegetable oil, about 375°. Cook 2-3 minutes. Then drain on paper towels. While still hot, sprinkle with salt and pepper and serve immediately.

SAUTEED MUSHROOMS

1 pound mushrooms
2 T butter
1 T oil
salt
pepper

Remove the stems from the mushrooms. Heat 2 T butter and 1 T oil over moderately high heat until it is bubbly and starts to spatter. Don't allow it to brown.

Place the stems in the skillet and saute for 5 minutes. Add the mushroom caps, round side down. Don't add more oil, although the mushrooms will absorb most of it immediately. Shake pan.

After 2 minutes, turn caps over and shake the skillet from time to time. Saute for 3 more minutes. Sprinkle with salt and pepper before serving. Don't cover if the mushrooms must wait for other food. (A cover will cause a change in texture and the mushrooms will release their juices.) If they must be rewarmed, heat for 1 minute only.

More oil is needed if mushroom slices are to be sauteed. If the mushrooms are small, the stems may be left on the caps, but the pound should be cooked in 2 groups, using half the butter and oil each time.

MUSHROOM BURGERS

½ pound mushrooms
1 pound ground beef

Divide the pound of ground beef into 4 patties. Divide each patty again to yield 8 patties. Slice the mushrooms.

Make a sandwich with 2 meat patties and a mound of sliced mushrooms. Work the edges of meat together, making "stuffed" burgers. Broil or fry. The same procedure makes a great meat loaf.

MUSHROOM SPAGHETTI SAUCE

½ pound mushrooms
1 clove of garlic, minced, then mashed
1 10-oz. can tomato puree
1 6-oz. can tomato paste
2 T olive oil
½ t oregano
½ t basil
½ t salt
1/8 t pepper
½ t sugar
¼ c water

Slice the mushrooms. Put all ingredients in a saucepan and mix. Bring to a quick boil and then lower the heat. Gently simmer the sauce 5-7 minutes.

DEEP FRIED HYDNUM

Separate fungi into small clusters. Prepare a thin batter from pancake flour, according to package instructions. Dip fungi into batter, drop into hot oil and fry until golden brown.

book reviews

BATTLE FOR THE WILDERNESS by Michael Frome, Praeger Publishers, Inc., New York; 1974, 246 pages, $8.95.

Michael Frome's "Battle for the Wilderness" could have been titled "Civilization in Crisis" since Frome attempts more than just a historical resume of the wilderness movement, its trials and tribulations, and the environmental awakening of the 60s leading to enactment of the Wilderness Act of 1964.

Frome's epilogue, "Where the Battle Begins," contains the real crux of the whole wilderness issue. And, he's right in his approach. As a dynamic, inventive, aggressive people, we Americans have not accepted kindly any restrictions of our old national credo that growth has no limits. We are finally waking up to the awe-filled truth that we have been living off the fat-of-the-hog without regard to the long-range consequences of achieving our short-term goals.

It was refreshing to be reminded by Frome that our main wilderness problems (as well as most environmental problems) do not arise from temporary and accidental malfunctions of existing economic and social systems. Rather, they arise from a profound incompatibility between deep-rooted beliefs in continuous accelerated growth, and the dawning recognition that the earth is limited in its resources and is vulnerable to thoughtless mishandling.

Paul Ehrlich and others told us the same thing back in the late 60s, but we were too busy being the world's greatest extractor, greatest producer, greatest consumer and the greatest waster—and at the same time providing for an expanding population with no clear idea where the growth syndrome was taking us.

The central theme of "Battle for the Wilderness" focuses on "Wilderness Values" and "Saving the Wilderness." I welcomed the return to the conservation archives to once again review the numerous contributions of conservation giants such as Bob Marshall, Aldo Leopold, Gifford Pinchot, John Muir and the Murie brothers. This time I could clearly see how their contributions played a vital role in securing wilderness as one of the essential constituents of our national culture. Somehow, I had missed this transition in the past.

Frome does a superb job in relating to the reader how certain federal agencies such as the Forest Service and the National Park Service have failed in their responsibilities to make the 1964 Wilderness Act work as it was designed to. His point is well taken when he suggests that federal agency leadership is reluctant to cross swords with the economic-political power structure. He also raises a good question when he asks, "Should the burden of upholding an act [the Wilderness Act] of Congress be borne by the public when public servants presumably are paid to furnish this specific service?" As the federal resource agencies are rapidly learning, no conservation program will succeed during this age of environmental awareness unless it has public support and is judged consistent with public interest.

The author, as previously mentioned, draws no quarter when he suggests that at present no single agency is "directing itself with passion" to fulfill the true scope of the Wilderness Act. Therefore, Frome suggests enactment of a new agency, such as a U.S. Wilderness Service. The idea certainly does have merit and it might be a better way of insuring a wilderness resource for present and future generations.—*Ken Walcheck*

PARKS FOR PEOPLE by Ben Whitaker and Kenneth Browne, Winchester Press, New York; 1971, 144 pages, $5.95.

In some parts of the United States, the ratio of people to wildlife is such that wildlife management has evolved into the social business of people management. In most of the world's urban centers, the people to land ratio is such that the creature most in need of conservation is man. The wonderfully flexible human spirit; the ever growing, always changing human personality, the childlike "wonder of it all" needs preservation.

"Parks for People" is a compact, concise handbook, designed to assist the need for more and better parks. The book contains over 100 photographs and drawings illustrating some of the more imaginative ideas from city parks around the world. Various chapters deal with vandalism, cost, administration, and the place of art, sports, cafes, water and children's play areas in a successful park.

The book is "down" on unnecessary fencing, posted grass, large expanses of concrete, too many square lines, noise and paved play areas. It is "up" on trees, grass, rocks, bridges, tunnels, screening, quiet places and soft and imaginative play areas.

The book is a must for urban planners and architectural students. It should be read by legislators, natural resource students and those who live in towns with over 10,000 population. A need exists for the kind of information presented in this book.—*Mike Aderhold*

HOME BOOK OF TAXIDERMY AND TANNING by Gerald J. Grantz, Stackpole Books, Harrisburg, Pa.; 1969, 160 pages, $7.95.

The best taxidermists can be classified as artists and good taxidermists at the very least are highly skilled craftsmen. As with cooking and cabinetmaking—and most other arts and crafts—the best "how to" books cannot assure success. Aptitude and experience cannot be underestimated.

Gerald Grantz has over 40 years experience in taxidermy and for 15 years offered a mail-order course through *Field & Stream*. This book is designed for the beginner. It is logically arranged, clearly written and well illustrated. It lists necessary tools, basic supplies and 26 supply houses where forms, eyes, papier-mache, tanning chemicals, etc. can be ordered.

The book's best section details several methods of working with fish. The only confusing section is mounting whole animals. The chapter on home tanning will guarantee that you never throw or give away another deer hide.—*Mike Aderhold*

SPRINGBOARD

"It is obvious that the idea of conservation is more than ever in need of support, as the tempestuous advances of science and technology multiply the hazards. But conservation is an uneconomic idea and has therefore no acknowledged place in a society under the dictatorship of economics.

"When it is occasionally introduced into the discussion, it tends to be treated not merely as a stranger but as an undesirable alien, probably dishonest and almost certainly immoral.

"In the past, when religion taught men to look upon nature as God's handiwork, the idea of conservation was too self-evident to require special emphasis. But now that the religion of economics lends respectability to man's inborn envy and greed, and nature is looked upon as man's hindrance, what could be more important than an explicit theory of conservation? We teach our children that science and technology are the instruments for man's battle with nature, but forget to warn them that, being himself a part of nature, man could easily be on the losing side."—*Dr. E.F. Schumacher, economist, from B.C.* Wildlife Review

FOR DISCUSSION

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studying energy development

by Bob Martinka
illustration by Donita Sexton

How will large-scale coal and energy development affect our fish and wildlife resources? Because of potentially detrimental consequences, the Montana Department of Fish and Game initiated several studies in eastern Montana. Concerned mainly with the effects of strip mining on wildlife in specific areas such as the Bull Mountains, Decker-Birney area, etc., the study will also explore potential damage to the aquatic resources of the Yellowstone River from large-scale water withdrawals.

Why is the department involved in this controversy? The department's duties include maintaining and enhancing wildlife populations and habitat throughout the state, wherever possible. One of the department's goals reads, in part: benefiting "the people of Montana and visitors with optimum outdoor recreational opportunities . . . and insuring maintenance and enhancement of the quality of the environment." This goal can't be fulfilled without an active interest in coal and energy development. Legislative criteria for the department's involvement include: the 1973 Utility Siting Act, the 1973 Strip Mining and Reclamation Act, the 1973 Water Use Act (making fish and wildlife a beneficial use of water and allowing a reservation of stream flow) and the Yellowstone River Water Use Moratorium passed by the 1974 Montana Legislature. These laws require either direct or indirect departmental participation.

Who pays for these coal and energy studies? Since Montana's sportsmen are not responsible for the developments, it's unfair for them to foot the entire bill for the studies. So, both governmental and private funds were solicited.

The Bull Mountains Coal Field Study—This program was initiated in January 1972 when strip mining appeared imminent. Gary Dusek heads the investigation which is sponsored jointly by the department and Consolidation Coal Co. (Consol). Objectives include: (1) determining the impact of surface mining on wildlife, (2) insuring that the value of wildlife habitat receives full recognition in any mining or reclamation effort and (3) investigating possible modifications or innovations in reclamation to avoid unnecessary loss of wildlife habitat.

Wildlife studied within the area include elk, mule deer and turkeys. Researchers also monitor revegetation success on a reclaimed test pit, but preliminary conclusions show the reclaimed area by itself does not provide the diversity of forage necessary to meet year-round requirements of mule deer. Since the Strip Mining and Reclamation Act prohibits contour strip mining—the most feasible mining method in the Bull Mountains—Consol's interest in the area has waned. Recently, some individuals from Utah showed interest in the area's coal resources.

Colstrip #3 and #4 Impact on Fish and Wildlife—In May 1973, the Montana Power Co. and four West Coast utilities applied to the Department of Natural Resources and Conservation (DNRC) for a permit to

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construct units #3 and #4 of a power-generating complex at Colstrip. As a part of their evaluation, the DNRC contracted the Department of Fish and Game to provide wildlife and fisheries data for the project's final environmental impact statement (EIS). The study included three parts: (1) Steve Knapp inventoried wildlife and sampled vegetation in the Colstrip area; (2) Mike Haddix reported on the aquatic resources of the Yellowstone River, emphasizing a section near Forsyth from which water will be withdrawn for the Colstrip plant's cooling system; (3) Pete Martin, Jim Wambaugh and David Ellis studied the impact of the 500 kv transmission line corridor on wildlife. DNRC received the final report in August 1974 and included it in the EIS on Colstrip #3 and #4 which was released in December 1974.

Sarpy Creek Basin Wildlife and Vegetation Study—Pete Martin heads this investigation which began in January 1974. Funded by the Cormorant Corp., a subsidiary of Northern States Power, the study has three main objectives: (1) to determine the impact of future surface mining operations on wildlife, (2) to insure that the importance of fish and wildlife habitat is fully recognized in any reclamation effort and (3) to investigate possible modifications, additions or innovations in surface mining reclamation to avoid unnecessary loss of wildlife habitat and to develop techniques enhancing habitat through reclamation. Preliminary results indicate the Sarpy Basin is a highly productive wildlife area. Because of limited funding, field work in the area is conducted part-time.

Decker-Birney Wildlife Study—This two-year investigation, funded by the Bureau of Land Management (BLM), will gather fish and wildlife information for a federal study of the area and develop techniques to quantify wildlife resources. Habitat quality and population productivity will be two of the indicators. The investigation includes seven high priority coal leasing areas identified by the BLM. When the federal government rescinds its ban on leasing federal coal deposits, these seven areas will probably be among the first leased.

River Studies—Researchers began studying aquatic insects and forage fish on the lower Yellowstone River in August 1974. Funded by Intake Water Co. and the Old West Regional Commission (OWRC), the investigation will (1) inventory aquatic insects and forage fish which support fish populations in the lower Yellowstone and (2) assess the potential effects of reduced river flows on these segments of the aquatic ecosystem. Chief investigator Bob Newell faces an interesting and challenging job because little research of this type has been done in eastern Montana.

Two fishery studies are progressing on the lower Yellowstone River, one from the Bighorn River to Miles City and the other from Miles City to Sidney. Mike Haddix heads research in the upper section and Larry Peterman handles the lower portion. The Department of Fish and Game funds Haddix' study and Peterman's is supported by the BuRec with small contributions from Colorado Interstate Gas and Panhandle Eastern Corp. Objectives include: (1) understanding fish populations and their habitat requirements, (2) adapting equipment and sampling techniques to studies on large rivers and (3) developing methods for predicting the impact of reduced river flows on important sport fish. Biologists have discovered a large spawning migration of many of the popular sport fish such as sauger and shovelnose sturgeon. Preliminary data suggests they use tributary streams, in part, for spawning. The studies began in spring and summer, 1974.

Beside supporting a large number and variety of fish, the Yellowstone River is used by a variety of waterfowl, migratory birds and furbearing animals. Because of this, the OWRC financed two studies beginning in September 1974. The first, a migratory bird study headed by Tom Hinz, (1) inventories migratory birds (ducks, geese, bald eagles, herons, etc.) using the middle and lower Yellowstone and (2) assesses the importance of the river and the potential effects of reduced stream flows on these birds. Many Canada geese, ducks and bald eagles use the river during various seasons. For example, over 200 bald eagles used the river during spring 1974. Pete Martin spends part of his time studying furbearers, especially beaver, and habitats along the lower and middle Yellowstone. The study also includes an assessment of the potential impact of altered stream flows on these animals. The beaver are quite abundant in certain sections of the river and the study will examine why they usually live in bank burrows here, rather than constructing lodges from tree branches.

In August 1974, Al Elser, regional fisheries manager for the department in Miles City, began studying fish in the Tongue River. Funded by the Environmental Protection Agency and OWRC, these studies gather basic fish population data and determine species diversity and distribution of fish along the length of the Tongue. Elser will determine the potential effects of dewatering on this stream and its fish. The Tongue contains Montana's only known self-sustaining river populations of rock bass and smallmouth bass.

Since the Yellowstone River could support large amounts of water-based recreation, OWRC funded a study to investigate usage and identify potential. A portion of the study will focus on the impact of altered stream flows on current and potential recreational uses such as boating, fishing, waterfowl hunting, agate hunting, etc. Max Erickson began this study in November 1974.

Efforts to determine the effects of coal and energy development on fish and wildlife are in their infancy. Hopefully, the various studies will shed some light on how best to preserve Montana's land, wildlife and clean environment.

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Montana State Fishing Records

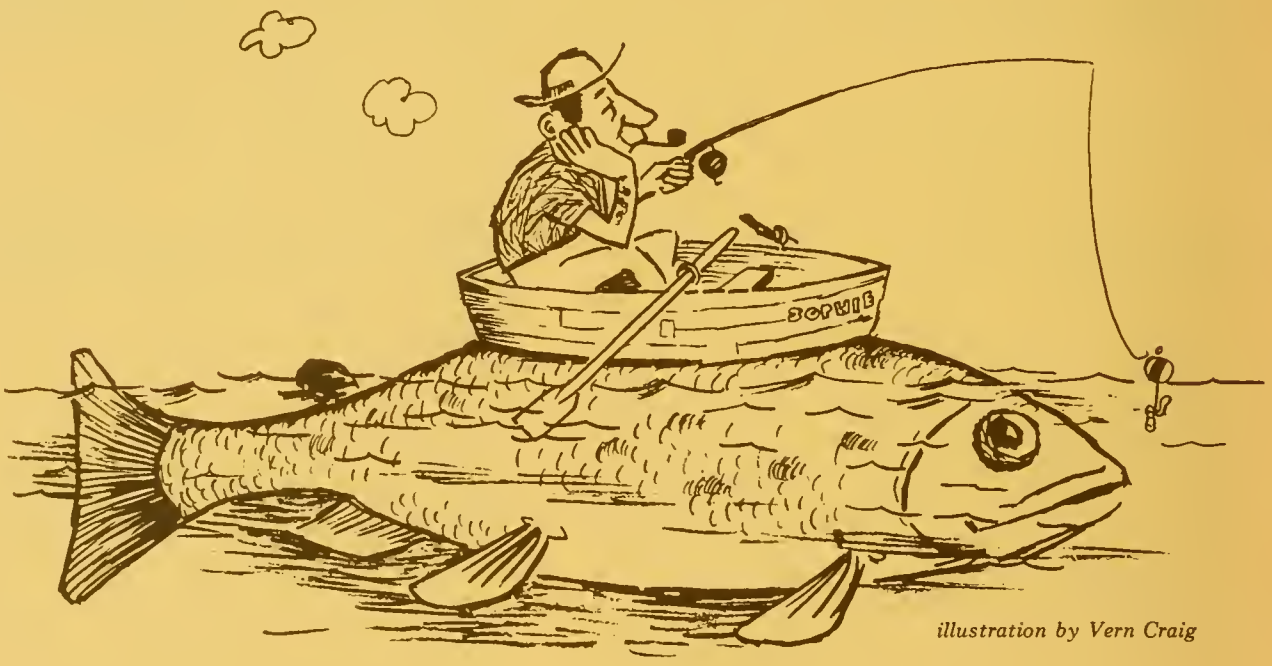

illustration by Vern Craig

More and more anglers must be competing for state fishing records. In 1974, six categories had no official records. In 1975, only one—lake whitefish—had no takers. Also, several records changed during the year.

If you're interested in seeing your name on the 1976 list, catch a bigger fish than the one listed. Then follow these rules to enter your whopper:

(1) Weigh the fish on a government-tested scale such as those in grocery stores or meat markets.

(2) If possible, weigh the fish in the presence of a department employe. (An affidavit stating length and weight from the store at which the fish was weighed is acceptable.)

(3) The fish must be correctly identified. If you're in doubt, contact a department fisheries biologist to verify the trophy's identification. (A photograph clearly showing all characteristics will usually suffice.)

(4) Information—length, weight, how caught, date caught, body of water in which caught, nearest town and name and age of fisherman—should be sent to the Environment and Information Division, Department of Fish and Game; Helena, MT 59601.

Good fishing—even if you don't break a record.

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Species	Weight	Angler	Year	Location
Brook trout	9 lbs. 1 oz.	John R. Cook	1940	Lower Two Medicine Lake
Brown trout	29 lbs.	E.H. "Peck" Bacon	1966	Wade Lake
Black crappie	3 lbs. 2 oz.	Al Elser	1973	Tongue River Reservoir
Bluegill	2 lbs. 8 oz.	George Schlosser	1967	Dengel Reservoir
Burbot (ling)	11 lbs. 12 oz.	Jim Cooper	1967	Fort Peck Reservoir
Coho	4 lbs. 14 oz.	Irven Stohl	1973	Fort Peck Reservoir
Cutthroat trout	16 lbs.	William D. Sands	1955	Red Eagle Lake
Channel catfish	21 lbs. 5 oz.	Gary Eppers	1964	Missouri River
Dolly Varden	21 lbs. 7 oz.	Dallas Eklund	1957	Flathead Lake
Drum	13 lbs. 6 oz.	George Gallagher	1973	Fort Peck Reservoir
Golden trout	1 lb. 6¼ oz.	Glenn Klofstad	1973	Island Lake
Grayling	2 lbs. 10 oz.	Mark Daniels	1974	Handkerchief Lake
King salmon (chinook)	4 lbs. 7 oz.	Berry Gillis	1972	Missouri River
Kokanee salmon	5 lbs. 4 oz.	Unknown	1969	Helena Valley Reservoir
Lake trout	28 lbs. 5 oz.	Kurt Olsen	1974	Flathead Lake
Lake whitefish	No record			
Largemouth bass	7 lbs. 6 oz.	Jere Hightower	1973	Ninepipe Reservoir
Mountain whitefish	4 lbs. 2½ oz.	Bob Johnson	1973	Clark Fork River
Northern pike	37 lbs. 8 oz.	Lance Moyer	1972	Tongue River Reservoir
Paddlefish	142 lbs. 8 oz.	Larry Branstetter	1973	Missouri River
Pallid sturgeon	38 lbs.	Emil Knutson	1950	Tongue River (mouth)
Perch (yellow)	2 lbs.	Gerald Pottratz	1974	Nelson Reservoir
Rainbow trout	20 lbs.	C.J. Brohaugh	1952	Cliff Lake
Rainbow-cutthroat hybrid	17 lbs. 10 oz.	R.A. Rousselle	1973	Ashley Lake
Sauger	5 lbs.	John Hafla	1974	Tongue River
Smallmouth bass	4 lbs. 4 oz.	Mrs. Bert Campbell	1971	Loon Lake
Sturgeon (shovelnose)	8 lbs. 12 oz.	Leo Chapel	1974	Missouri River
Sturgeon (white)	96 lbs.	Herb Stout	1968	Kootenai River
Walleye	14 lbs.	Neil Berg	1974	Nelson Reservoir
White crappie	1.72 lbs.	Ken Walcheck	1972	Tongue River Reservoir

Neil Berg of Wolf Point started his ice fishing season off with a new state walleye record. The big fish weighed 14 pounds, measured 32 inches long and 17 inches around. It was taken through the ice at Nelson Reservoir, 20 miles east of Malta. Berg used a 12-pound test line and leader with a minnow attached. The new record broke the old standard of 13 pounds set in 1972. F&G photo by Mike Aderhold

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dear F&G

Growth Isn't Progress

I consider your Jan./Feb. 1975 issue the best by far I have read. I think the cover art is superb with its unique style and I wish there could be a calendar using that art. The writing, research and material is unusually good.

I consider the basic subject, growth, of the utmost importance, around which many critical subjects erupting today revolve. For 20 years, I have individually stressed that growth isn't progress but quite the reverse. America's mania for growth and quantity as the criteria for everything makes her maturity suspect and makes a "high standard of living" synonymous with organized waste.

Unfortunately, few recognize the major role railroads can play, directly and indirectly, when properly organized and managed in resolving the interlocking conservation, ecology and economic woes. Railroads can go beyond hip-shot legislative cures for energy savings. The critical point of fundamental conservation and long-range survival must realistically be directed toward the public's prodigal pet, the automobile.

No matter how distasteful it may seem, it must be clearly recognized that a nation which bases its fundamental economy and gross national product on the automobile—with its terrific impact on the steel, oil, rubber and many other important industries—is headed on a collision course with nature's inexorable laws, a real fateful smashup of the most dire consequences.

Academic "studies" and "hearings" will never defuse such a catastrophic time bomb. The crisis won't just go away no matter how often the Pollyannas and the developers go to the wishing well.

With such an ominous situation surfacing and the various entries in the ledger added up and audited to support the weather warnings, there must follow the all-important question: Where are the energy sources in the halls of Congress to give torque to major reform and a drastic change of direction?

Is it possible to bring back some of the human vigor and courage of the horse-and-buggy days? Those days were also the days which made America, the days of empire building on a grand scale, which only railroads could make possible. Ironically, railroads also made possible the meeting of mass supplies to create their nemesis, the auto.

Railroads are an example of vastly superior energy conservation *working* on a massive scale. They are economical to construct, unrivaled in non-disturbance to the environment and capable of giving maximum service to society, regardless of local conditions or terrain. They need to be properly organized to avoid a falling domino condition, such as the bankrupt Pennsy causing the bankruptcy of seven major rail systems nearby.

This points out that railroads have a critical relationship to the fundamental economic and environmental imbalance created by the adamant fetishism for a total national monetary balance. This crisis creates a greater crisis by the opportunistic demand for strip mining, useless dams and granting high priority to highway systems which accommodate more energy-wasting autos. Long-range programs of enormous importance to the nation to advance environmental integrity and concentrate on energy-saving programs (which will guarantee major results and deflate inflation) must wait until some indeterminate year when the monetary budget might be balanced.

Quantity and random growth add cumulative woes instead of thinning out the weeds. The boastfulness about the high standard of living often doesn't see that such a standard is simply disorganized growth. If a nation ignores this and also cannot see the best area to effectively and immediately obtain enormous energy savings, then it is in the grip of a deadly fatalism which the pilot of a boat crossing the Delaware could never foresee.

The bankruptcy of the Pennsy is a symbolic lesson and a warning.—*Howard C. Snyder; Sandpoint, Idaho*

SPRINGBOARD

"We can, if we but will, fight Arab oil with American coal. If we wait to open the western states' coal reserves until we know they can be mined without environmental damage, we will be sitting on unused coal when hell freezes over."—*Rush Moody, Jr., federal power commissioner*

FOR DISCUSSION

POWER GENERATION CALLED "A ONE-SIDED TRADE OFF"

When I visited Montana recently, I was pleasantly surprised to find your excellent publication. It very much fills a need, and most states, especially those in the West, could well emulate it to their advantage.

It takes much powerful and continuous effort to turn aside, even slightly, an ingrown philosophy that one should make as much money as possible, as fast as it can be made, any way it can be made. Unfortunately, because of far greater destructive capabilities than were formerly the case, individuals and organizations can now work over this earth like it has never been worked over before. Creating massive air pollution over wide areas, grinding up the earth over many square miles, effecting widespread removals and transfers of water with little concern for the consequences and marching thousands of miles of towers and high tension lines over the landscape are some of the works now scheduled for Montana if certain corporations do as they wish.

Groups exist in various western states who would burn, grind and divert far more than is necessary to satisfy that state's needs. In the process, they create inconceivable amounts of dangerous, uncontrollable air pollution and laying back of the earth. For Montana, this means using the state's air, land and water to supply parts of the Northwest, Southwest and Midwest with all the power they might desire without their having to endure any of the pollution and degradation that goes with its generation.

Plans down the road envision Montana having at least ten—or more—gigantic coal-fired power plants (over two million kilowatts), only one of which would be required to supply the entire state's needs. Not a single one of the myriad pollutants created by massive coal burning installations is now satisfactorily controlled. Prospects for effective control are slight to nonexistent.

Three primary pollutants and ten or more others are discharged into the atmosphere by these mammoth power stations. Only a segment of *one* of these pollutants, the larger particle matter, is partially trapped. (A figure of over 99% efficiency is assigned by the manufacturers to the single device now in common use to try and trap this pollutant.) Even here, effective control is woefully lacking because so-called technology, after some 50 years of effort, has not been able to contain the sub-micron particles (1/25,000 of an inch or less) created by these installations. These are the most dangerous of the particles because they so easily pass right through the respiratory system, into the lungs and remain there.

Mention of the other two-thirds of the pollutants (gaseous and mostly unseen as they clear the stacks) is rarely made because control of these hard-to-trap and dangerous substances even now is a far-away dream. No device is envisioned that

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will effectively trap the thousands of tons created daily—sulfur and nitrogen oxides, vaporized mercury, cadmium and other trace elements, unburned hydrocarbons of carcinogenic character—which this type of burning now injects into the atmosphere. (The coal is ground up into fine powder and blown into the furnace; a 2-million-kilowatt plant burns over 20,000 tons of coal daily.)

Montana is a wonderful land and a most admirable type of rugged individual has helped keep it that way. But if the heads of some large and powerful coal and electric companies, in cooperation with a few federal officials, have their way, most citizens can expect to see large-scale desecration of the land and all the ill effects associated with the poisoning of their surroundings. No more will Montana have a big, healthy sky.

Some bureaucrats are fond of using the term "trade offs," as if the average citizen gets something in exchange for this massive generation of power for out-of-state regions. A wholesome environment will have been traded for the world's largest sources of uncontrollable pollution. Do you want this for Montana? If not, the Secretary of the Interior and Russell Train, head of the federal Environmental Protection Agnecy, would be glad to hear from you—and should.—*Harris Heller; Boulder, Colo.*

JANUARY ISSUE DRAWS COMMENTS

We bought a house near Whitefish in November and we are planning to move to Montana soon. At first, I thought that *Montana Outdoors* would give me some information about hunting and fishing areas. I have found out that it deals with much more.

We now live about 30 miles south of San Francisco and know what the Montana people are worried about. This is one of the reasons that we're moving away from here. Although I feel that it's too late to do much with California, I would like to become involved with the problems concerning Montana.

In your Jan./Feb. 1975 issue, I read other people's views on growth and development. I think I detected the same feelings that I have and this gives me hope. I do not think that Montana wants or needs large developments like Big Sky or Ski Yellowstone. Although it's too late to keep Big Sky out, it's not too late to limit its growth. When it comes to growth and development, I am probably more radical than most. I would like to see Montana stay like it is, plus a little cleaning up.

I must admit that I don't know as much about the road at Ennis or the power lines as I'd like to, but I *do* know that I don't want them.

It was saddening to read about the subdivisions outside Missoula. The poll reprinted in your magazine indicated that many people would like to see Missoula reach a population of 100,000. I wonder how many of these people have lived in a city of that size?

On the subject of nonresident hunters, I believe that if a person wants to hunt a certain state, then he should live in that state. I understand the argument about federal land belonging to everyone. I can also see that the state is the only one which can regulate its own game laws to everybody's benefit. I'd like to see part of the license money go to the nongame species, so they can be studied and helped.

It's time for the people of Montana to determine what they want the future to hold for their state. I would like to join the Montana Wilderness Association and other related groups interested in Montana's future. Would you send me their addresses so I might get in touch?—*Irv Coutts; Menlo Park, Calif.*

"BLOODY THURSDAY" DRAWS IRE

I'm a resident of South Dakota presently, but when the opportunity arises, I want to move to Montana.

I read an article about "Bloody Thursday" in a national magazine recently (*Outdoor Life*, October 1974) and it angered me greatly.

Things like this should not be permitted to take place in any state's legislature. If in the future, there is any possible way in which I can help, please notify me. I will do everything I can to rectify the situation.—*Dick Johnson; Sioux Falls, S.D.*

MORE ON WINTER CAMPING

The article on winter camping (Nov./Dec. 1974 *Montana Outdoors*) was basically well done and quite informative. I was most happy to read the section about food for winter camping and must commend you for mentioning the fact that supermarkets generally carry less expensive, but equally nutritional, meals in dehydrated and freeze-dried forms. The high cost of commercial "mountaineering foods" is enough to discourage anyone except the wealthy from camping. A little extra time spent repackaging some of the supermarket brands will usually reduce the weight of such items considerably, so backpackers and ski tourers are able to keep food loads adequate and also lightweight.

An alternative to the standard "three-meals-per-day" system, which I have found to be considerably more practical on winter backpacking trips, is to have only two cooked meals each day—breakfast and supper. Lunch consists entirely of nibbling frequently during the hike. Such a day-long meal would include dried fruits, cheese, nuts, candy, jerky—and lots of water! The solids supply energy and protein while the water prevents dehydration of your body, a danger even in winter and especially above timberline.

My sole criticism of the article is the sleeping bag section. Down bags are *not* as reliable sleeping gear as some of the bags insulated with this new Dacron polarguard or the polyurethane foam (polyfoam) that is just beginning to break through the down propaganda. Many people are still not aware that, while down bags are warm and lightweight, they are totally useless for insulation when the bag becomes even slightly wet from snow, rain or condensation. The polarguard and polyfoam mummy bags (mummy is considerably warmer than rectangle) are still warm, even if a hiker or snowshoer accidentally sinks his sleeping bag into a stream hidden under the snow. A synthetic mummy bag weighs only a few ounces more than the equivalent down mummy bag, but provides the same degree of warmth and comfort—at half the price!

In addition, I'd like to suggest two other sources of very reliable information regarding winter backpacking, ski touring, snowshoeing and general winter camping: "Mountaineering, the Freedom of the Hills," third edition, edited by Peggy Ferber (Seattle Mountaineers, Washington; 1974, 478 pages, hardback, $6.75) and "The Wilderness Handbook" by Paul Petzoldt (Norton & Co., New York; 1974, 286 pages, hardback, $7.95).

I wish to assure you that I find your magazine of very high caliber and one of the very few fish and game journals that includes much more than just hunting and fishing stories.—*Alan Brooks, publications editor, Natural Resource Ecology Laboratory; Colorado State University, Fort Collins*

WAYS TO INSURE THE FUTURE

I'd like to comment on two articles in your Jan./Feb. 1975 *Montana Outdoors*.

First, about the development of Montana, I hope your state won't allow the things that have happened to mine. Subdivisions bring nothing but headaches in the form of overpopulation, water pollution and sewage problems. Your state and a few more are the last strongholds for wildlife and public enjoyment of hunting, photography and a vast outdoors of pure air, drinking water and escape from everyday hassles. My state used to have an abundance of pure streams, hunting and fishing before the massive influx of housing developments.

Second, concerning "The Federal Take-Over," the main reason I haven't hunted in Montana is your guide law. I feel this is a violation of a constitutional right to force someone to have a guide when hunting. I don't think the goal is to stop hunters, but to preserve game for the outdoors person to enjoy. I feel that new laws could give big game a greater chance for survival by shortening the season with

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modern-day rifles and extending bow and black powder gun seasons. Only the most avid hunter would secure his trophy. I would be glad to return to black powder guns or bow if it meant insuring the future for upcoming generations of hunters.—*Tucker Williams; Fredericksburg, Virginia*

• *Montana's guide law was declared not enforceable by Judge Frank Blair of Ennis in July 1974 (Montana v. Donald Jack). The case is presently under appeal to the Supreme Court of Montana.*—Ed.

PLANS TO KEEP HIS GOOD NEIGHBORS

Thanks a whole bunch for Vern Craig's descriptive cartoons on "How Big Game Seasons are Set" (Nov./Dec. 1974 *Montana Outdoors*). My residence is Pennsylvania, but my heart's in Montana, and while on my mountain there this past summer, I spent an afternoon in hysterics over a mere "digest" of the game laws.

Fact is, I thought I was making some progress in deciphering the thing. I had already computed the season and hours of hunting in my zone as being determined by moon phases divided by tidal trends in Georgetown Lake subtracted from the Accuweather forecast and multiplied by the birthdate of the deputy game warden.

I still somewhat dread setting one unauthorized toe over the invisible dividing line at the neighboring zone. But I don't plan to spend $151 for an out-of-state license anyway; I can use that money for gas and groceries next summer. Nor do I plan to post my mountain as so many of us outsiders seem to do. What the heck—you guys have been trekking those hills a whole lifetime; I want you for good neighbors when I come back next summer.—*Milton E. Detterline; Limerick, Pa.*

MEDDLERS WELCOME

I read the article, "Making Molehills Out of Mountains" (Sept./Oct. 1974 *Montana Outdoors*), concerning impending development of a major strip mine on the Flathead River. It is extremely rewarding for us here in British Columbia to see your concern over this scheme.

Unfortunately, Canadians are not always sensitive to threats such as this, nor are they as organized or as capable of fighting such proposals as Montanans seem to be. Therefore, it is of great value to us to receive support and a show of concern from conservationists south of the border.

Certain people will, no doubt, accuse you of meddling in Canadian affairs. Ignore them. If Kaiser Resources, Ltd., can meddle in Canadian affairs—by building a major strip mine in the pass just north of the Flathead—then Montana conservationists can also meddle in Canadian affairs. It will be the people of the Flathead Valley in Montana who will receive the downstream benefits of this project.

We appreciate your concern and we will be only too happy if you can make an international incident of this ill-conceived, misguided and probably uneconomic scheme.

Incidentally, we are trying to instigate a resource planning study of the Flathead and Elk rivers watersheds in British Columbia and of the east slope of the Rockies in Alberta. Perhaps Montana should be included in this study?—*Bob Jamieson, Ta Ta Creek; British Columbia, Canada*

MIGHTY DOLLAR COUNTS

We appreciate the stand you have taken concerning developers, subdividers, etc. This is not the case here in Wisconsin. It seems that almost everyone is interested in exploiting until there's nothing left. The mighty dollar is all that counts.

My son and I have enjoyed short hunting trips to your state the last couple of years. It is truly an experience that one will not forget. Keep up the good work; we only hope more people will become aware before it's too late.—*Nathan Shrock; Birchwood, Wis.*

CASH OBSCURES ISSUES

I just received my copy of the Jan./Feb. 1975 issue. Thank you for taking on the weighty responsibility of informing Montanans and outsiders who love Montana about the real losses from exploitative development and badly planned growth.

As an agricultural writer, I am frequently asked to couch arguments in terms "that people can understand," i.e., to put a dollar value on agricultural changes.

My grandparents, Fay and Winifred Jeffers are descendants of Myron Jeffers and William Ennis, founders of the towns of Jeffers and Ennis. I often think of the incredible changes they have seen in the Madison Valley in the last 80 years. These changes that development brings about in the overall ecosystem are noticed best by residents of long duration. Sentimental twaddle perhaps, but I won't try to put a dollar value on the disappointment that growth engenders.

I am reminded of an experience that my mother, Jane Jeffers Rybus, had recently. Born and raised in the Madison Valley, she had looked forward to hiking into the Gallatin Range from the Ennis side with a childhood friend. After the arduous hike, they reached the summit of the ridge. Expecting to be enveloped in solitude, they were instead faced by bulldozers working on the Big Sky development. How do you put a cash value on their disappointment?

The developers like to couch their arguments in cash terms. Cash only obfuscates the issues.—*Thomas B. Rybus; Colton, Wash.*

POLICY ON LETTERS

Letters published in the "dear F&G" section of *Montana Outdoors* do not necessarily reflect the opinions and philosophies of the Montana Department of Fish and Game. They represent the author's feelings. We reserve the right to edit letters for length.

FIRE IMPROVES HABITAT

Thanks for your timely story, "Forest Fires and Wildlife," in the Nov./Dec. 1974 *Montana Outdoors*.

Since fire is recognized as an integral part of the ecological complex, there is no doubt that it can be used not only to benefit wildlife, as you point out, but also to benefit forests. Indeed, experience and research have demonstrated that fire can improve the habitat for wildlife and also help to regenerate stands of the more valuable species such as lodgepole pine, Douglas fir and ponderosa pine.

So, prescribed fire has a definite place in forest land management. But the big problem in its use has been the question: *How?*

In the southern pineries where fire is now widely used, the U.S. Forest Service has come up with sure and effective methods. However, in the Rockies, entirely different conditions prevail such as climate, topography, fuels, etc., and prescribed burning techniques await development and testing. But rest assured this will be forthcoming *with a bit of prodding*.

In summary, here is an often quoted statement first used by Dr. E.V. Komarek: "Fire is a bad master but a good servant—but like all good servants it must be handled with understanding and firmness."—*Marlin H. Bruner, associate professor of forestry (emeritus); Clemson, S.C.*

• • • • •

I have always thought that controlled burning of timberlands was the thing to do, as pointed out in "Forest Fires and Wildlife" (*Montana Outdoors*, Nov./Dec. 1974). The Indians always burnt over the country in the spring of each year so they could have game to eat and pasture for their horses. Now we have only brush 15-20 feet high and no game in our county.

Say, that ling fish sounds good, too ("The Ling," MO, Nov./Dec. 1974). I envy author Bill Miller because I have never been able to try ice fishing.

We are so pleased with *Montana Outdoors* that we may order some gift subscriptions for others who might enjoy the magazine. And, we recognize some of the places you mention from previous visits to Montana.—*Fred and Lily Norwood; Waldport, Ore.*

recycled paper

HYPOTHERMIA: recipe for death

by Don Malmberg

It seemed like an ideal day to start their week-long backpack into the rugged high country. Although the weather forecast was less than perfect, that July morning dawned clear and crisp.

With spirits high, the party began their wilderness excursion. Most of them dressed warmly, anticipating bad weather. But John—young, strong and foolish—wore only a light shirt and cutoffs. Hiking was hard work, and he knew the exertion would keep him warm.

Later that day, bad weather drifted in. First, a foggy overcast covered the bright blue sky. Then, the wind came up, and a gentle mist began. The temperature dropped to about 50°F.

Not everyone in the party was as physically fit as John, so frequent rest stops were called. John became chilled while resting, so he always wanted to keep going. His companions urged him to put on some extra clothes and keep quiet. But he didn't want to disrupt his neatly arranged backpack. So he left the others and plunged ahead. "Sure it's getting chilly," he thought, "but only about 50° or so. Nothing serious."

As the day progressed, the weather worsened. But nobody thought much of it, especially

continued

top—F&G photo by Paul Bushaw, middle left—F&G photo by Tom Warren, middle right—U.S. Coast Guard photo, bottom—F&G photo by Bill Schneider

John. They wanted to make Plateau Lake before dark instead of camping along this rocky ridge. So they pushed on. John was far ahead now.

About 2 p.m., John started shivering. But he'd shivered before, so he didn't think much of it.

About then, his companions noticed his slower and more forced movements. They were actually gaining on him. They saw him shivering, but weren't alarmed. They talked to him, but he either murmured something unintelligible or didn't respond at all. "If he wants to be such a he-man, let him suffer," they all thought.

But John slowed to a stop, blocking the trail. "What's wrong?" they asked. No answer. Obviously, he was in some sort of stupor. All his muscles seemed cold, unresponsive and rigid.

They sat him down, thinking he needed rest. Something was seriously wrong, but nobody knew what. They wrapped him in a coat, but it was too late. John lost consciousness, and an hour later, he died.

John, strong, young and physically fit, died of hypothermia, the silent and almost unknown killer of unprepared recreationists. His death and many more could be prevented if all outdoor recreationists—not just backpackers, but boaters, skiers, hunters, fishermen, etc.—would only take a few moments to bone up on basic facts about hypothermia.

"Hypothermia," you say. "Why, I've never heard of it. And if all those people died from it, I would at least know about it, wouldn't I?"

Many people haven't heard of hypothermia because such fatalities go into the books and newspapers as "died of exposure" or "drowning."

The outdoor world has much for us to see, use and enjoy. But Mother Nature also has several recipes for death, one of which is hypothermia.

"Hypothermia" means the body loses heat faster than it produces it, thus lowering the temperature in the body's inner core. So if you're in Mother Nature's kitchen working or recreating, don't fall into her mixing bowl. Combine a chilled and fatigued body with wind, wetness and cold, and you have hypothermia.

• *Cold*—Some hypothermia cases develop in water. You can die of hypothermia, even though you're floating safely in a life preserver. The "exposure in water" chart (page 37) shows that water temperature determines how long you can last before exhaustion, unconsciousness or probable death occur. (Wearing a wet suit considerably prolongs survival.)

Most hypothermia cases develop in air temperatures between 30-50°F. The cold that kills is the cold water that draws off body heat—running down neck and legs, held against the body by soaked clothing and flushing body heat from the surface of clothing.

• *Wetness*—when clothing becomes wet, it loses up to 90% of its insulating value. Wool loses less than cotton, down or synthetics. Wetness doesn't only come from rain. It also involves fog, melting snow, immersion and even condensed perspiration. Wet clothing is like a wick. If a wind is blowing and the wet victim is generating heat by heavy exertion, this "wicking action" dissipates heat faster than the body can produce it.

The thermal conductivity of water (or ice) is 240 times greater than that of still air, which means that body heat is extracted 240 times faster in wet clothes than dry clothes.

• *Wind*—The chilling effect of cold and wetness is increased greatly by wind. An unprotected head may lose up to 50% of the body's total heat production at 40°F. and up to 75% of the body's heat production at 5°F. This recalls an old maxim: "When your feet are cold, put on your hat." Wind refrigerates wet clothes by evaporating moisture from the surface.

The wind chill table (page 36) shows the relationship between temperature and wind velocity.

Mix cold, wet and windy conditions with the unwary person, and the result could be fatal. To understand hypothermia, effects of cold on the body must be recognized. The body's first response is constriction of surface blood vessels in the skin, soon spreading to the subcutaneous tissue. The restricted flow of blood in these tissues slows the heat transported from the core of the body. This, in

HOW TO USE WIND CHILL TABLE: Temperature is shown across top of table. Wind velocity is shown by figures at left of box. Locate the equivalent temperature of the wind-chill factor by finding the coordinates made by two lines drawn through figures in the table from the current temperature and wind velocity.

WIND CHILL TABLE

° F Dry-bulb Temperature

MPH	35	30	25	20	15	10	5	0	−5	−10	−15
	WIND CHILL INDEX (EQUIVALENT TEMPERATURE)—Equivalent in cooling power on exposed flesh under calm conditions										
CALM	35	30	25	20	15	10	5	0	−5	−10	−15
5	33	27	21	16	12	7	1	−6	−11	−15	−20
		COLD									
10	21	16	9	2	−2	−9	−15	−22	−27	−31	−38
			VERY COLD								
15	16	11	1	−6	−11	−18	−25	−33	−40	−45	−51
				BITTERLY COLD							
20	12	3	−4	−9	−17	−24	−32	−40	−46	−52	−60
							EXTREME COLD				
25	7	0	−7	−15	−22	−29	−37	−45	−52	−58	−67

turn, results in the lowering of skin temperature and then decreasing the temperature of the body's extremities. Shivering starts shortly after the initial constriction of surface blood vessels. If heat loss continues, temperature of the body's inner core begins to drop and the following symptoms occur:

99-96°—Shivering becomes intense and uncontrollable. The ability to perform complex tasks diminishes.

95-91°—Violent shivering persists. Speech becomes vague, slow and slurred. Amnesia may appear.

90-86°—Shivering decreases and is replaced by muscular rigidity. Erratic or jerky movements signal poor muscle coordination. The victim may have total amnesia. He generally maintains posture and the appearance of psychological contact with his surroundings.

85-81°—The victim becomes irrational, loses contact with his environment and drifts into a stupor. Muscle rigidity continues and pulse and respiration slow.

80-78°—Victim becomes unconscious and most reflexes cease to function. Heartbeat becomes erratic.

Below 78°—Cardiac and respiratory control centers of the brain fail. Cardiac fibrillation, probable accumulation of fluid and hemorrhage in the lungs occurs, followed by death.

Hypothermia can be prevented with sufficient knowledge, adequate clothing, emergency rations and emergency shelter. Some basic steps to prevent hypothermia include:

• *Stay dry.* If you become wet, change into dry clothes or dry your wet clothes. Put on rain gear *before* you get wet.

• *Don't underestimate cold.* Many outdoorsmen don't understand the danger of 50° weather. Put on wool clothes or other warm apparel *before* you start shivering. In choosing clothing for recreation, select layers which provide more-than-adequate warmth and can be added or subtracted according to the degree of exertion. Depending on when, how long and where your outing is, take along a hooded rain cape or jacket and also carry leg chaps or wind/rain pants. Remember, the back of your head and neck are especially vulnerable to cold.

• *Food intake is vital.* To prevent hypothermia, your body must supply heat energy faster than the heat is drawn off. Sweets are most quickly converted into energy, while proteins and fats have a longer lasting warming effect.

• *Make camp early.* If shivering is intense and prolonged, exhaustion can result. Even for one-day outings, carry emergency shelters such as survival blankets or tube tents. Bivouac before the least protected member of your party becomes exhausted and before coordination and judgment are impaired.

• *Keep active.* If you must camp out overnight without shelter, keep continuously active to insure adequate heat production. Avoid fast, violent movement to prevent heat from being "pumped" out through openings in your clothing and to keep your perspiration rate down. Try isometric exercises of all muscle groups to warm up.

If someone in your party shows hypothermia symptoms, first prevent any further heat loss. Then, add heat to rewarm the victim's body. Ideally, putting the victim in a tub of water at 110°F. or a hot spring works best. But these are rarely available. Therefore, utilize the following steps (depending on the stage of hypothermia):

• Get the victim out of the wind and rain.

• Replace wet clothing with dry.

• Get as much insulation between the victim and the ground as you can.

• If the victim is conscious, give warm drinks.

• Put the victim into a prewarmed sleeping bag. The bag can be prewarmed by another person stripped to underclothes. Warm (not hot), well-wrapped rocks or canteens also work.

• If the victim is semi-conscious, try to keep him awake and give warm drinks.

• If a sufficiently large bag is available, put another stripped person in the bag with the victim. Skin to skin contact from a warm donor is the most effective field treatment.

• If the victim is unconscious, keep him in a prone position with head tilted back to insure an open air passage for breathing.

• Build a fire to warm the camp.

• Forget that St. Bernard's keg, because alcohol has no place in the rewarming process. It could cause a too rapid release of cold surface blood to the body's core.

• Remember, if spending time outdoors, don't take chances. Take heed of hypothermia weather. Keep hypothermia in mind when choosing equipment. Know hypothermia symptoms, treatment and prevention. In general, be prepared.

Exposure in Water

If water temp. (F.) is . . .	exhaustion or unconsciousness occurs in . . .	and expected time of survival is . . .
32.5	under 15 min.	under 15-45 min.
32.5-40	15-30 min.	30-90 min.
40-50	30-60 min.	1-3 hours
50-60	1-2 hours	1-6 hours
60-70	2-3 hours	2-40 hours
70-80	3-12 hours	indefinitely
over 80	indefinitely	indefinitely

THE CANYON FERRY PROJECT:

from dust to ducks

by Don Childress

TODAY'S CONSERVATION EFFORTS deal primarily with saving remaining wildlife habitat and enhancing it. During crucial times, wildlife often takes a back seat to economic growth and countless articles document man's blundering ability to destroy for economic gain. But in some instances, man can amend his former acts to benefit wildlife.

In 1955, the Bureau of Reclamation (BuRec) completed the filling of Canyon Ferry Lake and thousands of acres of valuable wildlife habitat were lost. Prior to 1966, the dam was operated primarily for power generation and lake levels were kept relatively high. Since 1966, flood control has become an integral part of the operations and winter drawdowns are made in anticipation of spring runoff. During these drawdowns, many acres of lakebed are exposed during the spring. (These areas were once farmed along with adjoining land.) After inundation for several years, all vegetation has disappeared and the soil mantle has broken down into fine-grained material highly susceptible to wind erosion.

During spring, dry conditions and high, gusty winds are common to the area. These conditions result in dust storms which have created economic and health problems for area residents at the upper end of Canyon Ferry Reservoir. The storms often engulf Townsend and compel motorists to use their headlights during daylight.

The BuRec, responsible for operating Canyon Ferry Reservoir, began experimenting with dust-suppression measures in fall 1966. This program included fencing, corrugating, planting vegetation and diking. By 1968, it was clear that most measures tried were not entirely successful and that a more permanent solution to the dust problem would have to be found. Residents urged that the

continued

upper left—A dust storm near the lower end of Canyon Ferry Reservoir before this federal-state project began. Bureau of Reclamation photo. lower left—What some of the mud flats might look like after the project is completed. photo by Jon Cates

Montana Department of Fish and Game coordinate dust-suppression measures and try to enhance wildlife resources in the area as well. In fall 1968, the BuRec began a special two-year investigation to permanently solve the dust problem. Efforts resulted in the Canyon Ferry Unit Dust Abatement Program, a dust control and wildlife development project.

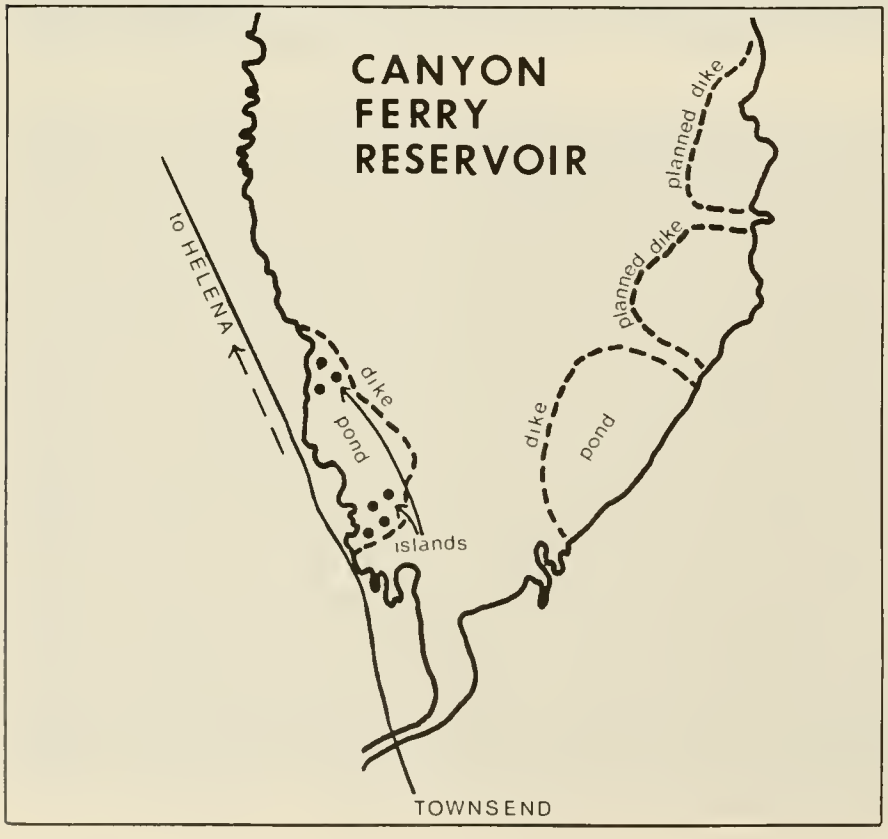
FOUR IMPOUNDMENTS

The dust abatement plan utilizes four impoundments constructed from approximately ten miles of silt-retention dikes. Each impoundment will be equipped with gated water controls and a gravity flow water supply from the Missouri River. Silt deposits from the lake side of the dikes will be excavated by hydraulic dredge and deposited behind the dikes to minimize dust from the lake side areas. The deposited material will act as a sealant for the impoundments and, most important, create the necessary water depth for establishment of desirable aquatic vegetation.

Construction began in 1972 on the west side section, and the dike, dredging and water supply canal are now complete. One east side dike has been built and the water supply canal is under construction. The entire project should be completed by December 1978. When finished, the four dikes will create 1,879 acres of marsh and aquatic habitat.

Construction costs are difficult to determine, but the BuRec estimates about $10 million. Items specifically "billed" to wildlife total $130,000—a trivial amount compared to total cost. But wildlife would benefit little if certain considerations had not been built into impoundment design.

Up-to-date concepts in waterfowl management have been incorporated into the construction phase. Although the BuRec designed the impoundment, the Department of Fish and Game suggested modifications to benefit waterfowl. For example, placing dredged materials at certain contours and depths allows the best possible interspersion of cover vegetation and open water. A reef in the west side pond will provide a seed bed for emergent vegetation which will be surrounded by open water. These conditions fulfill the nesting requirements of several waterfowl species and marsh birds. The reef will also serve as a resting area for waterfowl and reduce wave action behind the reef.



CONTROLLING WATER

One of the most important aspects of any waterfowl area is the water supply and the ability to control water levels. Several of the nation's waterfowl areas can neither obtain water at the desired time nor reduce water levels during a specific time of the year. This may prove to be Canyon Ferry's strongest point as a waterfowl area. The water supply, the Missouri River, is available at any time. Each dike is equipped with gates so water levels in the ponds may be regulated to any depth. (Water manipulation is necessary for the management of aquatic plants which, in turn, govern the area's use by waterfowl.)

Construction in phases allows experimental work before final inclusion of certain facets of the plan. In 1973, 30 experimental nesting islands were constructed in the west side pond. (Canada geese prefer islands for nesting sites.) Island design experiments tested the most suitable size, shape, material composition and vegetation cover for a nesting island. The materials which worked best were then incorporated into a final design being used for the rest of the project. The islands provide necessary nesting requirements for Canada geese and yet withstand erosion from wave action. When work is completed, 100-140 nesting islands will be available to waterfowl.

PAST IMPORTANCE

The fact that the area has a prior history of use is important. For example, Canada geese nested in the delta for several years, but nesting success was a boom or bust proposition. High water flooding and spring runoff before the eggs hatched victimized these river-nesting geese. During these years, the number of offspring was small and the goose flock never reached

its full potential. With a more secure nesting habitat, islands in the impoundments, the Canada goose population will expand accordingly.

Past records indicate sporadic use of Canyon Ferry Reservoir by migratory waterfowl. An aquatic food source and resting areas will probably mean more consistent use by migratory birds. Ducks rarely nested here in the past, but once habitat has been developed, the duck population should rapidly increase.

Construction of the impoundments presented an opportunity for an in-depth ecological study on the sequence of development of plant, insect and wildlife communities in newly created habitat. To do the research, the BuRec funded the Agricultural Experiment Station at Montana State University and the Department of Fish and Game. Researchers will collect information on the development sequence and distribution of aquatic plants and insects, and associated responses by waterfowl and other wildlife species to a newly created habitat. Researchers will also formulate plans for maximizing the benefits to wildlife.

When construction and development of the marsh ecosystem is done, recreational use should increase substantially. Estimates by the U.S. Fish and Wildlife Service (FWS) suggest a minimum increase of 600 man-days of hunting per year. Once furbearers respond to development of marsh habitat, the area may produce some 1,000 pelts annually, the FWS estimated.

Increased recreational benefits apply to nongame species, too. Shore and marsh birds will no doubt present themselves to the casual observer, bird watching groups and photographers.

The Canyon Ferry Unit Dust Abatement Program has more potential than producing ducks from dust. It demonstrates what happens when an agency such as the Bureau of Reclamation responds to an opportunity to benefit wildlife.

Man-made islands soon become vegetated and provide excellent sites for waterfowl nesting. photo by Gordon Warren

Water is diverted from the Missouri River to the diked areas. Gates allow project managers to control the water level, which is vital to important vegetation for waterfowl. photo by Gordon Warren

Emergent vegetation—also important to wildlife—is replacing the mud flats of lower Canyon Ferry Lake. photo by Gordon Warren

if you really care, leave them alone

left—fawn, photo by Jon Cates. right, from top to bottom—killdeer, photo by Jon Cates; cougar, photo by Alan Nelson; bighorn sheep, photo by Jon Cates; child with fawn, photo by Bill Eaton

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editorial

if you really care, leave them alone

It happens every year, so I suppose we should prepare for it again. There's something about fawns and bear cubs that makes it impossible for people to keep their hands off them.

During June and July, people stumble onto a little fawn (or bear cub, nestful of horned owls, coyote pup, moose calf, etc.). These well-meaning recreationists exclaim, "Look at it. It's so lonely, and probably half-starved, too. Its mother is probably dead, so let's take it home." Or on other occasions, they say, "Wouldn't this make a great pet? Let's keep it for Johnny."

Unfortunately for the animals, some people do indeed remove the babes from their home in the wilds. They keep them for a few days or weeks. And then, after realizing they don't really want them, these do-gooders show up at our offices with orphaned wildlife. "Will you help us save this fawn," they ask? "Its mother was killed, but we can't keep it ourselves."

About then, they get their ears bent a bit. Removing a game animal, game bird, songbird, furbearer or bird of prey from the wild violates Montana law, and fines may be levied for such violations. More important, though, taking *any* wild animal home with you creates problems—for both you and the animal.

What's done is done, so we take the orphans under our wing. We prefer returning them to the wild, of course. But it doesn't always work. An animal which can't escape the loving hands of its human kidnappers probably can't make it without its mother. In such cases, we look for a place for it in a zoo. But most zoos are already overpopulated with the more common species, so there isn't much demand. With all options exhausted, we occasionally put the animals to sleep, just like unwanted cats and dogs in the local pound.

That's sad, you say. We agree. But what's really sad is the harsh fact that this death or lifetime imprisonment wasn't necessary—*if* the wild infants were only left alone in the first place.

Was the babe abandoned? Not likely. The mother was probably only temporarily gone. Or even worse, imagine her watching forlornly from a distant hiding place as you carried off her offspring. Members of the deer family, for example, instinctively remain a few hundred yards away to avoid attracting attention to their helpless infants. Also, many animals leave their young briefly to feed. In short, that fawn lying motionless in the brush or that bear cub grasping a small tree, *isn't abandoned*. Just think. After you've

kidnapped her babe, the mother might return to feed the youngster, only to find an empty nursery and lingering human scent.

A few additional points should be considered:
— It's dangerous to fool with young wildlife. The instinct to protect young is strong in wild animals, so you could be confronted with an enraged mother. And the young animals are dangerous themselves, regardless of how cute and cuddly they look.
— Taking the wildlife babes home may seem like the humane thing to do, but rest assured, *it isn't*. Instead it's the cruelest, most inhumane action you could possibly take. And it's very difficult to successfully substitute for natural foods, particularly with young deer, antelope, elk and moose.

— If your daughter or son really wants a pet, get one from the local pound.

— Frequently, people orphan young wildlife by touching or picking them up. When the mother returns to find her offspring heavy with human scent, she may reject them.

— It takes about 10 times as much time and care to domesticate a wild animal as it does a cat or dog. And some wild animals (e.g. foxes and coyotes) never become completely tame.

— It costs our department thousands of dollars each year to feed and care for the orphaned wild animals people thoughtlessly kidnap.

So considering all this, *please*, for the animals' sake, leave them alone. You *can't* help them.—*Bill Schneider*

photo by J.B. Lowhead

THE STEEL SHOT GAMBLE

—see page 2